City of Red Bluff

1993 Natural Environment Element



Natural Environment Element

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NATURAL ENVIRONMENT ELEMENT

I. INTRODUCTION

A. General Description of the Element

The Natural Environment Element is a collaborative element that fulfills the statutory requirements of both the Conservation and Open Space Elements. The purpose and intent of this collaboration is to provide the reader with a more comprehensive and holistic view of the natural environment in the City of Red Bluff.

The Conservation and Open Space elements address issues that are either directly or indirectly related. This interrelationship fostered the need and ability for the element. Although there are no State guidelines for a Natural Environment Element, there are individual statutory guidelines for both the Conservation and Open Space elements. Those requirements were the basis for this element, and were carefully examined and addressed in order to secure the legal viability of this element.

B. Statutory Responsibilities/Requirements of the Element(s)

The Conservation and Open Space Elements are required to address certain mandatory issues. In general, the Natural Environment Element should address issues relating to; vegetation, wildlife, water resources, soil resources, atmospheric resources, mineral resources, and open space. The preservation, conservation and managed production of these resources is a fundamental part of the element.

A more detailed summary of the statutory responsibilities and requirements of Conservation and Open Space Elements is presented in Appendix A.

C. Internal Consistency

It is mandated by California State Law that, "...that the general plan and elements and parts thereof comprise an integrated, internally consistent and compatible statement of policies for the adopting agency." (Governor's Office of Planning and Research 1992, 24).

In order to comply with the internal consistency statute and to increase general effectiveness of the element all existing plan elements (Circulation, Housing and Land Use) were reviewed. Relevant goals, objectives, policies, and implementation measures provided by the three updated elements were incorporated into the Natural Environment Element and are indicated with underlining. The Noise and Safety Elements are currently being updated, and so they were unavailable for review and inclusion.

D. The Natural Environment Element as a Planning Tool

Once the Natural Environment Element is adopted by the City Council, it becomes law. In turn, all of the policies, programs and implementation measures cited in the element become legally enforceable. It is important that element be thoroughly reviewed before adoption so that it reflects the needs of the community once it becomes law.

In order to be effective, the guidelines set forth in this element must be implemented. It is the responsibility of local decision makers and the City staff to ensure that these guidelines are followed. Each section of this element is concluded with an executive summary, followed by a set of goals, objectives, policies, and implementation measures. These are the tools for implementation and are therefore the responsibility of the City.

The physical environment and needs of a community are constantly changing. This element should be dynamic to ensure it reflects theses changes and maintains its effectiveness as a planning tool. This can be accomplished through periodic review and revision.

A list of related case laws and other planning laws that may be used to enforce this element can be found in Appendix B.

NATURAL ENVIRONMENT ELEMENT

II. VEGETATION

A. Introduction

There are a three general vegetation types/habitats found naturally in the Red Bluff Planning Area. These include; riparian corridors, oak woodlands (which include upland areas with valley grasslands mixed with shrubs and scattered oaks), and wetlands.

B. Oak Woodlands and Valley Grasslands

The oaks in California are geographically distributed in fifty-two of the fifty-eight counties in the State, and comprise a latitudinal distance of more than eight degrees (Allen, 1990, pg 22). These habitats range from the low Mojave Desert slopes to the high western ridges of the Klamath Ranges (Griffin and Muick, 1990, 6). This variation in spatial distribution is reflective of the great diversity in oak woodland habitats.

There are sixty species of oaks (Quercus) that occur in the United States (Griffin an Muick, 1990, 4). There are nineteen species of Quercus that are endemic to the State of California. Of these; ten are tree oaks and nine are shrub oaks (Griffin and Muick, 1990, pg 4). There are also twenty-one hybrid species of Quercus that occur naturally in California.

The most prevalent species of oaks found in the Red Bluff Area is the blue oak (Quercus douglasii), live oak (Quercus wislizenii), valley oak (Quercus lobata), and canyon live oak (Quercus chuycalepis). Valley oaks and live oaks are often associated with riparian areas. In Red Bluff, species of blue oaks (woodlands) normally dominate the upland slopes adjacent to riparian areas.

In general, blue oak woodlands are dominated by blue oaks and are often interspersed with other oak species in valley areas. Soil type and slope determine the morphology of the woodland. The canopy is usually divided into two stories with the tallest containing oaks from 15 to 45 feet in height. Average girth ranges from 8 to 12 inches in diameter at four feet above the base (Department of Water Resources 1991, 39).

There are many definitions of oak woodlands, and for the purposes of this element the City should use the definition cited below. This definition was presented in the Department of Water Resources study entitled, Sacramento Valley Westside Tributary Watershed Erosion Study, Reed's Creek Watershed. The study was prepared in 1991 and is reflective of the oak woodlands located within the City. The definition is divided into three categories based on canopy cover, and they are as follows:

> "Blue Oak Woodland (40 percent and greater tree cover) These areas are characterized by natural or nearly natural stands of blue oak. The trees are evenly distributed and undisturbed by harvesting activity.

Blue Oak Woodland (15 to 40 percent tree cover) These areas are predominantly mixed woodland and grassland. Tree stands are irregular and patchy; hill crowns are commonly bare of trees, and trees are most abundant on steep slopes and in gullies and ravines. Many places show evidence of selective cutting.

Blue Oak Woodland (0 to 15 percent tree cover) These areas are predominantly woodland converted to grassland with very sparse stands of blue oak remaining. Some natural savannahs are included." (Department of Water Resources 1991, 40).

Valley grassland in Red Bluff normally occur on the upland periphery of riparian areas and function as a transition zone between riparian and oak woodland habitats. These areas consist of annual and perennial grasses and forbs. Scattered individual species of oaks are also common in these grasslands (Department of Water Resources 1991).

There is a strong interrelationship between wildlife and oak woodland and grassland habitat. It has been estimated that there are currently 5,000 species of insects that utilize oak trees in California. Of these, approximately 1,000 are dependent upon the oaks for survival. There are fifty-eight species of lizard, snakes and amphibians that are associated with oak habitat. One hundred and five species of mammals depend on the oak woodlands as resource for their survival. Nearly all of the State's game species can be included in that number. Birds also utilize the habitat provided by the oak trees. In fact, it has been estimated that approximately 170 species of birds use these habitats at some point in their life span (Griffin and Muick, 1990 5).

The oak trees, both in stands and singly, provide many important functions in the environment. Beyond the provision of wildlife habitats, oaks; "..aid the cycling of nutrients, help prevent soil erosion, protect water quality on watersheds, purify the air we breathe, provide income from sale of hunting rights and wood products, enhance property values and attract tourist (Whittington, 1991, 20). These oaks are considered a valuable part of the State's heritage and yet only 48% of the planning agencies in the State have adopted tree protection ordinances (Whittington, 1992, 22).

The blue oak, valley oak and live oak are of special concern in California for several reasons. One of the major concerns is the difficulty they have in regeneration. Another reason is the continued loss of habitat due to grazing and cultivation (Department of Water Resources 1991).

C. Riparian Corridors

The City of Red Bluff is contained within the watershed of the Sacramento River. The Sacramento Basin covers an area of approximately 22,000 square miles and discharges an estimated 17,870,000 acre feet of water a year (from the lower Sacramento River) (Warner and Hendrix 1985, 3.8).

Riparian systems is a cumulative term that refers to the riparian areas and the associated plant and animal life. For the purposes of this element the definition provided by Warner and Hendrix, 1985 (Department of Fish and Game) will be used. The definition is as follows:

Riparian Systems "...are terrestrial sites where water, transported in from another place, accumulates sufficiently in the soil and other terrestrial substrates to potentially permit the growth of mesic (requiring medium to high soil moisture) terrestrial plants and associated animals...The riparian zone itself is bounded on the inner side by the aquatic zone with its saturated soils and hydrophytic plants, and on the outer side by the drier soils and xeric plants of the upland zone." (Warner and Hendrix 1985, 3.1).

It is estimated that there are currently between 600,000 and 1 million linear miles of riparian habitat in the State of California. This estimate was derived from the analysis of watercourse data from USGS 1:24,000 topographic maps (Warner and Hendrix 1985, 3.1). In general, the riparian zone extends from the watercourse to the 100 year floodplain (Warner and Hendrix, 1985, 3.1). There are several physical attributes which influence the type and extent of the riparian habitat.

The three major influences in the formation and structure of riparian habitat are; geomorphology, climate and hydrology and ecological interrelationships. The morphology of the land directly influences the characteristics of the riparian area by affecting the watercourse (and flow), erodibility, and associated vegetation. Location also influences which species will utilize the habitat area. Climate and hydrology affect the system by altering soil moisture, sunlight availability (photosynthesis capability hence biomass productivity), and the formation and perpetuation of microclimates within the system. The ecological interrelationships of riparian habitats can be very different from the surrounding (upland) areas. In fact, the species associated with these habitats do not always coincide with the natural distribution of flora within California (Warner and Hendrix 1985, 3.16-17). Riparian habitat areas (when undisturbed) provide a corridor for wildlife. An example of this is the important role riparian areas play in the migration of water fowl (e.g. the Pacific Flyway).

The extensive riparian areas in the City of Red Bluff naturally provide a lush and diverse habitat for many species of plants and animals. There are seven streams which run through the Red Bluff Planning Area; Red Bank Creek, Grasshopper Creek, Reed's Creek, Brickyard Creek, Brewery Creek, Dibble Creek, Blue Tent and their tributaries. All of these tributaries drain into the Sacramento River from the west. To the east; Paynes Creek Slough, Samson Slough and East Sand Slough offer areas of potential riparian habitat.

Riparian systems provide many environmental and social values. It is has been stated that, "No ecosystem is more essential to the survival of the nation's fish and wildlife...(and that) western riparian ecosystems contain approximately 42 percent of the mammal species of North America, 38 percent of the reptiles, and 14 percent of the breeding birds..." (Warner and Hendrix 1985, 4.8). A list of these and other species potentially found in Red Bluff can be located in appendices D, E, F, G, and H. Additional values include; shading (for adjacent

watercourses), bank stability (erosion prevention), organic input (and biomass), habitat for aquatic insects, recreation, and scientific and economic values.

D. Wetlands

Wetlands are transitional habitats between an aquatic and terrestrial environment where the water table is at or near the ground surface or the ground is covered by shallow water (Stokes et al 1989, pg 22). There are many different definitions for wetlands. The definition provided in the Federal Manual for Identifying and Delineating Jurisdictional Wetlands will be utilized for the purposes of this element. This definition should also be used for future studies (and surveys) performed by the City unless an updated version or other definition is deemed more appropriate by the City.

This definition was chosen based on its merits as a Federally accepted definition. It is endorsed by four Federal Agencies, including; the United States Fish and Wildlife Service, the Environmental Protection Agency, the Department of Army (Army Corps of Engineers), and the Soil Conservation Service.

The definition is; "Those areas that re inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas." (Wetland Training Institute 1989, 4). For more detailed guidelines refer to the Federal Manual for Identifying and Delineating Jurisdictional Wetlands.

The term wetlands encompasses a diverse collection of habitats which include; tidal flats, freshwater marshes, mangrove swamps, prairie potholes, peat bogs, cypress swamps, riparian wetlands, and vernal pools (Stokes 1989, 22 and Lollock et al, 1988, 25-31). The habitat type varies with geographic occurrence. Some of the factors which influence habitat type include; proximity to the ocean, type of climate, relation to inland water body, and soil type. Two types of wetlands occur within the Red Bluff Planning Area; riparian wetland and vernal pools.

The riparian wetland habitat is found in areas dominated by short (scrub/shrub) and tall (forested) hydrophytic vegetation, which have a minimum of 25% canopy cover (when foliage is present). These habitats are often associated with permanent and intermittent lakes, rivers and streams. Examples of typical plant species that dominate such habitats are; western sycamore, alder, willow, California bay, cottonwood, California blackberry, salmonberry, gooseberry, wax-myrtle, black walnut, box elder and twinberry (Lollock et al, 1988 pg 25).

The riparian wetlands provide habitat for an "...unusually high number of fish and wildlife species." (Lollock et al 1988, 25). Some species depend on the riparian wetland during different stages of their lives, while others may spend their entire lives within the habitat. Approximately 50% of the state and federally listed endangered and threatened fish, birds, amphibians, reptiles, and mammals rely on riparian wetlands.

Many species of birds depend on riparian wetlands for "..perching, roosting and nesting substrate..(and they also provide)..refuges and migratory corridors." (Lollock et al 1988, 25). Fish rely on riparian wetlands for "...cover.., spawning substrate, regulation of water temperatures, and preservation of water quality." (Lollock et al 1988, 25). In the summer, riparian wetlands provide terrestrial organisms with a cool environment, and a reliable, easily recognizable water source. In addition, riparian wetlands provide humans with a variety of recreational activities including, fishing, hunting, birdwatching, nature study, picnicking, and hiking.

Vernal pools are seasonal wetlands which are associated with the Mediterranean climate region of California (Lollock et al, 1988 31). There are only four other areas in the world that share this type of climate; Western Australia, the Southwestern corner of South Africa, Central Chile, and the Mediterranean Basin. The general characteristics of this climate are mild, wet winters and hot, dry summers. Vernal pools correspond to this climate by collecting water in the winter months and then shrinking and drying in the summer months.

Vernal pools not only require specific climatic conditions, but also require a certain combination of topography and soils. The topography is usually level plains dotted with small, shallow basins or depression. Below the surface there is normally an extensive impervious layer which permits the water to gather and remain for long periods of time. The weather and temperature will affect the duration of this inundation. The soils associated with this type of habitat are hydric and very fragile (Gustafson, S.S. 1990).

Vernal pools, like riparian wetlands, provide habitat for a number of both state and federally threatened and endangered species. Examples of these species include; "..frogs, toads, salamander,..aquatic insects,..and plants of plants." (Lollock et al 1988, 31). Vernal pools provide "..valuable outdoor classrooms for colleges and universities..." in which student can examine the morphology of the pools and the diverse populations associated with them. (Lollock et al 1988, 31). Migratory waterfowl such as; black-neck stilts, avocets, greater and lesser yellowlegs, egrets, herons, and smaller dabbling ducks utilize the resources provided by this type of habitat. Vernal pools provide such a delicate and rare balance of physical attributes, that entire orders of invertebrates are found only in these environments (Lollock et al 1988, 31).

Although these habitats provide valuable resources, they have and continue to be destroyed at an alarming rate. There have been many estimates as to statewide losses, however, it is generally accepted that there were originally 3-5 million acres of wetland habitat in the State. Today that number has been reduced to less than 500,000 acres. This figure, includes flooded agricultural lands which do not provide the abundant values for wildlife as available in naturally occurring wetlands (Lollock et al 1988, 21).

The destruction of wetlands in California has been the result of a variety of human induced activities. At present, the three main causes of habitat destruction in the State are; "..1) conversion of inland managed wetlands to

intensive agriculture and changes in crop practices; 2) urban, industrial, and port development on the coast of San Francisco Bay; and 3) channelization and ongoing maintenance of flood control channels." (Lollock et al 1988, 21).

Wetland habitat loss and degradation has placed immense pressure on the species of flora and fauna which depend on wetlands for food, shelter and breeding grounds. The tule elk was completely eliminated from areas due to such habitat loss and also due to overhunting (Lollock et al 1988, 21). There are approximately 24 animal species and several plant species that are listed as endangered, rare or threatened because of the loss of statewide wetland habitat. The remaining wetlands in the Central Valley provide wintering habitat for 60% of the waterfowl utilizing the Pacific Flyway (Lollock et al 1988, 21).

The overwhelming environmental, social and economic benefits associated with wetlands is the basis for giving them special consideration during the planning process. Their continual destruction and rapid extinction reinforces the need for protection.

E. Executive Summary

The existing native vegetation in the Red Bluff Planning Area provides environmentally and socially valuable resources for the community. These areas provide diverse and ecologically rich habitats for wildlife (including some endangered and threatened species), protect the soils from erosion, increase groundwater percolation, maintain water quality, and provide recreational and aesthetic resources for the public.

The majority of the City's natural vegetation occurs within and along stream corridors and adjacent upland areas. The exception to this, is the potential wetland (vernal pool) habitat areas located in the southwest section of the Planning Area, surrounding the Airport. Both the riparian corridors and wetland habitat areas are sensitive to development and are continually threatened by urban intrusion. It it vital to the maintenance of the current environment and standard of living that the City protect and preserve these areas. In order to achieve this, decisive regulation must begin today.

Currently, the Greenway and floodplain overlay zones (established in the Land Use Element) provide protection oak woodlands and riparian habitat areas. The goals, objectives, policies and implementation measures set forth below are intended to provide more extensive regulation and guidelines for these resources. In order for these guidelines to be effective, decision makers must consider and incorporate these into each land use decision. The consistency and accuracy with which these guidelines are implemented will directly reflect their effectiveness as planning tools.

GOALS

- Preserve the remaining oak woodlands and individual native species of trees in the Red Bluff Planning Area.

• Preserve and protect native grasslands in the Red Bluff Planning Area.

• Maintain and protect riparian corridors and associated vegetation and wildlife.

• Preserve and conserve wetland habitats.

• Conserve and improve groundwater, natural habitat, mineral, aesthetic, soil and air resources in the Red Bluff Planning Area (Land Use Element).

OBJECTIVES

• Protect and prevent human disruption in all areas designated as Greenways by the Land Use Element.

• Protect and prevent human disruption in all areas designated as Floodplains by the Land Use Element.

• Achieve and maintain a standard of no net loss of native tree species.

• Protect all riparian habitat areas located within the City of Red Bluff, and work with the county to provide protection for those areas located within the Planning Area.

• Conduct an inventory of all wetland resources in the Red Bluff Planning Area.

POLICIES

• Provide for the protection of native tree species by incorporating specific standards into all planning related decisions.

• Require an on site botanical survey, in addition to any CEQA mandated surveys, for all projects located in or near riparian areas, oak woodlands, and all areas where other endangered plant species have been identified.

• Require that all projects located in areas of potential wetland habitats prepare an on site survey, utilizing the City accepted guidelines for wetland delineation.

• Discourage digging trenches (for utilities, etc.) within the root protection zone (RPZ), and if unavoidable, require that all digging be done by hand.

• Discourage further development on prime agricultural soils and within riparian habitat, woodland, scenic areas and designated wetlands to preserve urban area environmental resources (Land Use Element).

• Discourage development that does not incorporate native physical land features into the project design (Land Use Element).

• Encourage planting, preservation and replacement of native trees (Land Use Element).

IMPLEMENTATION MEASURES

• Utilize the information provided in the wetland inventory (as designated by the objective above) in all land use decisions.

• Prepare and adopt a tree preservation ordinance that is focused on woodland habitat and individual native tree protection, as designated by the Land Use Element.

• Make the policies of the adopted tree ordinance available to the County Planning Department and encourage their compliance in areas surrounding the planning area periphery.

• Require all new developments to achieve a status of no net loss of native tree species. This may be accomplished through site design, replanting, or any other method that the City deems acceptable.

• Provide developers with a copy of How to Save Trees During Construction, Living with Urban Soils, and or The Right Tree for the Right Place or any set of guidelines which staff deems appropriate.

• Provide a list of compatible native plants for under and around oaks to those applicants developing in areas where oaks are present, and encourage the use of these plants in order to maintain oak and soil viability.

• Incorporate all findings and required surveys relating to endangered plant species and wetland habitats into the corresponding land use decisions.

• Restrict all development in riparian habitat areas.

• Enforce any of the 123 conditions and findings which relate to vegetation preservation, conservation and or maintenance as presented by the City of Red Bluff.

• Direct residential development, under careful site and project design to areas south of Kimball Road, west of the City outside creek floodways and riparian habitat and to the north, west of the freeway (Land Use Element).

• Implement **Grading, Drainage and Ground Cover Policies** Section IV A to minimize disturbance of riparian and other existing vegetation and Section V regarding vegetation preservation, replacement and new species introduction (Land Use Element).

• Implement **Land Development Policies** Sections II B 3,5 regarding tree cover and endangered species, III B regarding natural tree cover, and III C regarding development within greenways and floodplains (Land Use Element).

NATURAL ENVIRONMENT ELEMENT

III. WILDLIFE

A. Introduction

The Red Bluff Planning Area includes extensive tracts of urbanized land, which have replaced much of the natural habitat that once existed. The majority of wildlife found within the Planning Area occurs in the waterways that bisect the area and in the three vegetation types discussed in the prior section; oak woodlands and grasslands, riparian corridors (and greenways), and wetlands. These diverse habitats provide areas for breeding, nesting, feeding and shelter to a multitude of species. The following section briefly discusses the species of wildlife that are commonly associated with the habitat types found in Red Bluff.

B. Red Bluff

1) Birds

Riparian and wetland habitats provide important feeding grounds for migratory species of birds. These areas offer food, protection from the sun and predators, water and breeding grounds. Species that can be found in these areas are; the great blue heron, brown-headed cowbird, osprey, black-shouldered kite and several species of swallows. The Sacramento River is also a foraging area for the bald eagle, a Federally listed endangered species (USDA Forest Service 1990, 111-4).

Oak woodlands and associated savannah areas provide foraging habitats for bird of prey species, including hawks and kites. Several species of ground nesting birds also utilize this habitat type. Examples of these birds include; the white-crowned sparrow western meadowlark, and ring-necked pheasant. For a comprehensive list of potential species of birds in the Red Bluff Planning Area see Appendix C.

The Tehama County General Plan recognizes two species of birds whose habitat areas are included in the North I-5 planning area, which encompasses the City of Red Bluff. Although the habitat area may not be contained within the Red Bluff Planning Area, the information may still prove useful. The two species of birds are; the Wild Turkey and the Sandhill Crane. The maps delineating their habitat areas are available at the Tehama County Planning Department.

2) Fish

The Sacramento River flows through the Planning Area from the north to the south. The river itself provides an important habitat and breeding area for several species of fish. These species include; the federally listed endangered species of chinook salmon, steelhead trout, striped bass, king salmon, American shad, and white sturgeon (Department of Water Resources 1984, 7 and Tehama County Planning Department 1983, 111-44).

The westside tributaries and eastside sloughs of the Sacramento River also provide important habitat areas for different species of fish. The

majority of the fish that utilize these waters however, are non game species such as suckers. The headwaters of the larger tributaries may be periodically used game fish (salmon, trout, etc). For a more comprehensive list of fish species found in the Sacramento River and its tributaries see Appendix D.

3) Insects

There are a variety of insects associated with each of the major habitat types found in the Red Bluff Planning Area. The aquatic insects of the riparian systems play an important role in the food chain (Warner and Hendrix 1991, 4.26). The most notable insect in Red Bluff however, is the valley elderberry longhorn beetle.

The valley elderberry longhorn beetle (Desmocerus californicus dimorphus) is currently listed as a Federally threatened species. The California Department of Fish and Game's Natural Diversity Data Base identified a community of beetles along the Sacramento River where it bisects Interstate 5. This location is discussed at further length in the Endangered Species Section of the element.

4) Mammals

Species of deer, beaver, mice, squirrels and bats are often associated with the riparian and wetland habitat areas in Red Bluff (USDA Forest Service 1990 and Warner and Hendrix 1991). A comprehensive list of potential species of mammals found in Red Bluff is located in Appendix E.

5) Reptiles

There are approximately twenty species of reptiles associated with the riparian habitat found along the Sacramento River. The westside tributaries of the Sacramento River (specifically; Blue Tent Creek, Dibble Creek, Brewery Creek, Brickyard Creek, Reed's Creek and Red Bank Creek) provide some type of habitat for over thirty species of reptiles. See Appendix F for a species list.

6) Amphibians

The riparian habitat areas in Red Bluff provide optimal conditions for a variety of amphibian species. These species utilize riparian habitats for different phases of their lives, some even spend their entire life cycle within the habitat. A species candidate list for amphibians that may be found within the Red Bluff Planning Area may be found in Appendix G.

C. Executive Summary

The City of Red constitutes over 7.5 square miles of land. The majority of this land is urbanized or will be in the future. The existing wildlife in Red Bluff is dependent on remaining areas of natural habitat. The proper administration of the goals, objectives, policies and implementation measures of

this section and the Vegetation section are imperative to the maintenance of these populations.

It is the responsibility of the City to ensure that the guidelines of this element are enforced and that the existing wildlife is protected.

GOALS

- Protect remaining populations of native wildlife in the Red Bluff Planning Area.

- Preserve existing wildlife habitat areas, including; oak woodlands, valley grasslands, riparian areas, and wetlands.

- Conserve and improve groundwater, natural habitat, mineral, aesthetic, soil and air resources in the Red Bluff Planning Area (Land Use Element).

OBJECTIVES

- Prevent the extinction of wildlife species in the Red Bluff Planning area.

- Maintain, improve and where possible increase habitat areas in the Red Bluff Planning Area.

- Encourage the preparation of a local species list, which incorporates location, status, and extent of occurrence.

POLICIES

- Encourage projects that minimize the impact on habitat areas.

- Encourage the sharing of information regarding wildlife between the public and private developers.

- Promote infill and cluster developments in existing urban areas, and direct growth out of habitat areas.

- Promote infill development through incentives to manage community land use balance and increase efficiency of service delivery (Land Use Element).

- Encourage urban creek restoration (Land Use Element).

- Discourage further development on prime agricultural soils and within riparian habitat, woodland, scenic areas and designated wetlands to preserve urban area environmental resources (Land Use Element).

IMPLEMENTATION MEASURES

- Require a wildlife survey for all projects located in a potential habitat area and require that the findings of the survey be incorporated into the decision making process.

- Restrict development in areas where special (endangered or threatened) species of animals have been located.

- Provide development incentives for projects which incorporate habitat protection into project design.

NATURAL ENVIRONMENT ELEMENT

IV. ENDANGERED SPECIES

A. Introduction

The purpose of this section is to address the location and type of special species of plants, mammals, fish, birds and insects in the Red Bluff Planning Area. The existence of these species is already threatened and it is therefore imperative that they be addressed during the planning process.

B. Natural Diversity Data Base

In 1989 the California Department of Fish and Game converted the Natural Diversity Data Base to a Geographic Information System (GIS). The computing platform is made up of Hewlett-Packard computers and HP-UX (UNIX) operating system. The software is Genamap, which is a vector-based GIS. The Genamap software handles the graphic and geographic functions. The textual information is handled by Oracle, a relational data base manager (Department of Fish and Game 1992).

The NDDB provides information concerning special plants, animals and natural communities throughout the State. The cartographic base is modeled after the USGS 1:24,000 topographic quadrangles. The City of Red Bluff Planning Area is covered in two quadrangles; Red Bluff East and Red Bluff West. The maps are mylar overlays and they are accompanied by descriptive text. The maps and text are property of the City and may be found at the Planning Department.

There were a total of seven species identified on the two overlays. Three of these species occurred in the Planning Area, and two were just outside the periphery. The description, including location for these five occurrences is presented below.

C. Natural Diversity Data Base Listings

The following descriptions are taken from information provided by the Department of Fish and Game's NDDB. These listing were current as of May 6, 1992.

Northern Hardpan Vernal Pool-is one of the occurrences located just outside the Planning Area. It is currently not rated on either a Federal or State level. It is located on the Red Bluff West USGS quad, immediately southwest of Bidwell Airport, along Paskenta Road. There is approximately 160+ acres of the habitat. A field survey prepared by T. Griggs in 1980 can provide additional information.

Riparia riparia (Bank Swallow) is the other occurrence located just outside of the Planning Area periphery. The location is approximately one mile south of the Red Bluff Diversion Dam, on the left bank of the Sacramento River. Bank swallows are normally associated with riparian forests. Currently this species is on the California threatened list.

Cryptantha crinita (Silky Cryptantha)-is rated Category 2 under Federal listings. Category indicates that the species is currently under consideration for a Federal listing. The plants were located on the southern bank of Dibble Creek, approximately 400 feet southeast of the northbound I-5 bridge. The species was found on cobble banks, gravel and sandy bars.

Juncus leiospermus Var leiospermus (Red Bluff Dwarf Rush) was located approximately two miles south of Red Bluff near the Diversion Dam. Approximately 35% of the identified area fell within the Planning Area boundaries. The species is listed as under Federal Category 3C, which indicates that the species has been withdrawn from candidacy. The plant was found "...in low places in grain field, treeless plain and red clay soil."

Desmocerus Californicus Dimorphus (Valley Elderberry Longhorn Beetle) was located on the right bank of the Sacramento River at mile 246.2, along I-5 in the City. The beetle was found in a riparian habitat that had an elderberry understory and was overgrown by grape and blackberry. The species is currently listed as Federally Threatened.

D. Executive Summary

The data cited above provides valuable information as to the location and type of sensitive species located within the Red Bluff Planning Area. This information should be made available to the Planning Commission, City Council, Planning Staff and the general public. Even the occurrences located outside of the planning area could prove to useful, as indicators for potential occurrences in similar habitat areas within the planning area. It is therefore considered advantageous for the City to utilize all information provided by the Natural Diversity Data Base, and give it special consideration during the decision making process.

In order to maintain a viable natural community in Red Bluff, it is important to consider all facets of its environment, regardless of size. Balance is the key to maintaining this type of community and it can be done in a variety ways.

One of the most important facets in maintaining a balanced environment is first the recognition and understanding of its components. Special consideration should be given to those natural elements which are already threatened. One major source of information is the Department of Fish and Game's Natural Diversity Data Base. Copies of the overlay maps, base maps, and text are all available for City use at the Planning Department. It is a policy of the Department of Fish and Game that this information may not be copied and or used for private purposes.

A second way to acquire more detailed information is to require, and or encourage the preparation of site surveys on a project by project basis. This type of review will include any project which requires discretionary review by the City, including; all new developments, subdivision maps, and conditional use permits. This will allow the decision makers, the public, and or developers to better understand an area before irreversible alterations begin.

The cost of these site surveys could be left to the applicant (of the project), therefore eliminating the burden for the City. In exchange, the applicant would be provided with valuable information prior to the design of phase of his/her project. Prior knowledge of this type could save the applicant considerable money, while providing valuable information to the City. This information could also be made available to the public for educational purposes.

GOALS

- Provide a balanced environment in which all species are allocated habitat areas free from human disturbance.

- Protect and preserve viable populations of all special (endangered, threatened or sensitive) species of plants and animals in the Red Bluff Planning Area.

OBJECTIVES

- Protect and maintain ecologically rich habitat areas in order to prevent human induced eradication of endemic wildlife species.

- Conserve and protect habitat areas associated with special species of plants and animals.

POLICIES

- Restrict all development in areas where endangered and or threatened species have been identified by the Natural Diversity Data Base and other sources.

- Encourage biotic and botanical surveys for all projects, including those that are exempt (categorically and otherwise) from the CEQA process.

- Restrict any development or disruption that would alter the habitat where specific rare and or threatened species of wildlife and natural communities have been identified.

- Maintain and utilize current copies of the Natural Diversity Data Base.

- Encourage projects which take the natural environment into consideration by modifying site design as a means buffer sensitive areas.

IMPLEMENTATION MEASURES

- Require an extensive survey and study of areas located near the periphery of known occurrences of rare and or threatened species of wildlife and natural communities, and use those findings during the decision making process.

• Require that all information regarding new occurrences be transmitted to the Department of Fish and Game, Natural Heritage Division (see Agency Reference List in appendices for contact person and phone number).

NATURAL ENVIRONMENT ELEMENT

V. WATER RESOURCES

A. Introduction

This section of the Natural Environment Element discusses issues relating to the City's water supply and water quality. Issues relating to the watershed and riparian resources are addressed at further length in other sections of the element (Vegetation and Wildlife).

During the regular session of the State Legislature in 1983-84, Assembly Bill 797 was passed. This bill resulted in California Water Code Section 10610 et. seq. and required all "..all urban water purveyors with more than 3,000 service connections to prepare, adopt, and submit a water management plan to the State Department of Water Resources no later than December 31, 1985." (City of Red Bluff Public Works Department 1985, 1). At that time, the City of Red Bluff had an estimated population of 11,100 and was servicing 3,500 water connections. It was therefore required that the City prepare a management plan. This plan was updated in 1990 and then amended again in January of 1992.

It is required by State Law that the conservation element of the general plan be consistent with any pre-existing water management plan. It is therefore imperative that the existing plan be addressed here. The following information is presented in the City's Water Management Plan (and consequent updates), Annual Water Quality Reports (1989-1991), 1991 Annual Report to the Office of Drinking Water, and the 1991 Management Plan prepared by Bryan Murphy and Associates).

B. History

The City of Red Bluff owns and operates the municipal water supply and distribution system. The system was purchased from a local private company in 1921 (City of Red Bluff Public Works Department 1990). During the early 1920's there were approximately 3,100 people in need of water services. Today there are 12,568 people and approximately 3,700 water service connections (City of Red Bluff Public Works Department 1991 (1991 Annual Report to the Office of Drinking Water) and Bryan Murphy and Associates 1991).

The major source before the 1921 sale of the service system was the Sacramento River. This source was abandoned in 1921, and Antelope Creek was added at a later year. The Antelope Creek source was abandoned in the 1963. Presently, all municipal drinking water is taken from ground wells (City of Red Bluff Public Works Department 1990).

C. Water Supply and Consumption

The City of Red Bluff's water distribution system is completely self supplied, therefore not requiring the purchase of water from outside sources. All of the groundwater comes from the Sacramento Valley Groundwater Basin

(SVGB). The SVGB supplies groundwater for the majority of Tehama County, and the county supplies approximately 21% of the recharge for the basin. Red Bank and Reed' Creek play an important role in this recharge (Tehama County Planning Department 1983, 111-28).

The water supplied to the residents of Red Bluff comes from a reservoir and twelve ground water wells. The ground water table is considered to be abundant with levels from 30 to 60 feet below surface elevation. The water table has remained relatively stable, even in the years of drought and it is not anticipated that there will be a water shortage in the near future (through 2000). The depth of the aquifer occasionally fluctuates resulting in increased energy consumption for the electric well pump motors (City of Red Bluff Public Works Department 1990).

The average annual rainfall in the City of Red Bluff is 22 inches. The majority of this precipitation comes during the period from November through April. Summers are hot and dry, and winters are moderately cold. During the summer months of July and August, temperatures in excess of 100°F are common. It is during these summer months that the highest water usage and demand occurs (City of Red Bluff Public Works Department 1990).

In 1991, the system produced a total of 1,498.7 million gallons of water, and served a population of 12,568. The month of maximum water use was June, in which 200.5 million gallons of water were consumed (Red Bluff Water Department 1992).

The largest consumer group was the "general and residential", consuming a total of 900 million gallons. The second largest user was the commercial sector with a total of 596 million gallons. The industrial sector utilized the least amount with a total of 3 million gallons for the year.

There were five improvements made to the system in 1991. These improvements include: the completion of a computerized system for improved management and design; alteration (lowered bowls 40 feet) of well No.8; the addition of three dedicated sampling stations; the replacement of 2,100 feet of deteriorated and undersized mains; and the closing of the loop near Walnut and Bayless Street.

D. Water Quality

The City of Red Bluff has an excellent source of ground water which has consistently maintained a high level of purity. Each year the City prepares an annual water report that contains information regarding water source and quality. These reports were mandated by the State of California and began in 1989. Each year a copy of this report is distributed to every consumer.

The State has Maximum Contaminant Levels for mineral and chemicals in drinking water. The State Department of Health Services establishes these standards for drinking water based on the National Interim Primary Drinking Water Regulations (promulgated by the Environmental Protection Agency) (City of Red Bluff Water Department 1990, pg 3-1898 annual report).

The Maximum Containment Levels and the corresponding levels detected in the Red Bluff wells are presented in each annual report. The parameters of the report include; Clarity, Microbiological, Organic Chemicals, Inorganic Chemicals, Radioactivity, and Additional Constituents. All sources, with the exception of Bacteriological and Radiological, are tested every three years at a private laboratory (City of Red Bluff 1990).

Bacteriological sources require testing four times a week and the results of these tests are reported to the State Department of Health Services on a monthly basis. These tests are performed by the City, in a City laboratory. Radiological tests are performed every four years at a private laboratory. Pesticides are also tested, but only on an as requested basis (City of Red Bluff 1990, 1991, and 1992).

In the years following the initial 1989 annual report, water quality levels have remained constantly high. See Appendix H for the most recent (1991) water quality statistics.

There were a total of 42 written or verbal complaints made by customers in 1991. Twenty four of these were regarding leaks, all of which were repaired. The remaining 18 complaints were regarding physical problems, such as pressure, and were all investigated. There were no complaints regarding water quality (City of Red Bluff Public Works Department, 1991).

E. Wastewater, Sewage and Hazardous Waste Disposal

The present wastewater and sewage collection system comprises approximately 36 miles of sanitary sewer pipeline, six major trunk sewers, ten pumping stations and one sewage treatment (or water recycling) facility. The majority of the 36 miles of piping are located within the public-right-of-way (Bryan Murphy Associates 1991).

The sewage treatment plant, otherwise known as the water recycling facility is located along the Sacramento River (just south of where East Sand Slough joins the Sacramento River) on Messer Road. The average annual flow of discharge through this facility is over 1.15 millions gallons per day and it has a capacity of 2.0 million gallons per day. After the wastewater reaches the plant, it goes through a four part reclamation process.

The reclamation process includes; screening and grit removal, secondary treatment, disinfection and solid stabilization. The liquid portion of the final product is discharged into the Sacramento River. This effluent is high in quality, and often contains a lower amount of suspended solids than the water in the Sacramento River (Bryan Murphy Associates 1991). For more detailed information, maps and logistics of the wastewater and sewage disposal system, please refer to the City of Red Bluff 1991 Master Plan (Infrastructure Capital Improvement Program) prepared by Bryan Murphy Associates.

Hazardous waste disposal is managed by the county, as dictated by the Tehama County Hazardous Waste Management Plan (Volumes I and II). The hazardous waste generated by institutions, businesses and public agencies are removed from the site of generation and taken to an off site facility where they

will be stored, disposed of or recycled. The majority of waste shipped off site in 1985/1986 was; empty containers (42.5%), followed by PCB's and Dioxins (32.95%) and Organic Liquids (26.82%) (Vence et al 1989, 2-14,15,16).

It is estimated that individual households in Tehama County (including the City of Red Bluff) produced 124 tons of hazardous waste in 1986. The top three waste groups were; waste oil (35%), dye and paint sludges/resins (24%) and other inorganic solid wastes (16%) (Vence et al 1989, 2-29). Many of these wastes are disposed of or stored improperly and eventually result in the contamination of the natural environment.

One way to mitigate improper household waste disposal is to develop and administer a plan for its disposal. Another possible way is through education. Educating the public as to what common household products are hazardous to the environment and how to dispose of those products could help decrease the rate of contamination. This issue is addressed in the Goals, Objectives, Policies, and Implementation Measures of this section.

The Tehama County Hazardous Waste Management Plan identifies six contaminated sites in Tehama County. Three of the contaminated sites are located within the Planning Area, and one is located just outside of the southern boundary of the Planning Area. All four sites have been investigated and are either undergoing remedial action or have completed it. The four contaminated sites and a brief description of each are presented below.

In 1981 it was reported that the Diamond Lands Lumber Products, located on Diamond Avenue in Red Bluff, had two potential contamination sites. In 1985, it was discovered that the Plywood Division had been discharging phenolic resin into Reed's Creek and the Lumber and Fiber Division had been discharging recycled water containing wood wastes into the Sacramento River. The sites were investigated by the Regional Water Quality Control Board (RWQCB) and remedial actions were requested. By 1987, both the RWQCB and the Environmental Protection Agency (EPA) determined that, "...no further action was necessary." (Vence et al, 1989, 2-34,35).

In July of 1986 the Pacific Gas and Electric gas plant located on the corner of Oak and Rio streets was discovered. No contaminants have been identified as of yet and the Department of Health Services has, "... placed the site in the backlog site cleanup report portion of the Bond Expenditure Plan." (Vence et al 1989, 2-36). This plan is reviewed annually and it dictates specific remedial action plans for each site. The Sobek Ranch site in Paskenta is also listed in the Bond Expenditure Plan for Tehama County. For more information regarding the plan, please see the Tehama County Hazardous Waste Management Plan section 2.2.7.

The Louisiana Pacific Corporation site is located just south of the Planning Area (south of Red Bank Creek) on Reading Road and was discovered in 1985. This site violated several codes and contamination included; wastewater discharge, soil contamination, and unregistered underground tanks (including improper closure and or abandonment). Currently, all tanks

are registered, and the corporation is taking measures to rectify all violations (Vence et al 1989, 2-36).

Leaking underground storage tanks (for fuel, pesticides, herbicides, etc.) are another potential hazard that could influence water quality in Red Bluff. It has been estimated that one out of every ten tanks (or 10%) will undergo either a structural failure or leak of some sort. There were 318 tanks registered in the county as of 1987. This number does not include certain tanks which have a capacity of less than 1,100 gallons (Vence et al, 1989 appendix M and 2-37).

There are two basic pieces of legislation which monitor and govern underground storage tanks; California Administrative Code (Title 23, Subchapter 16) and California Health and Safety Code, (Division 20, Chapter 6.7). The Regional Water Quality Control Board, Department of Health Services, California Department of Fish and Game, Division of Environmental Health, Red Bluff Fire Department may also become involved in cases of contamination (Vence et al 1989, 2-37).

The potential for contamination through tank leakage (10% of all tanks) is substantial enough to warrant special consideration in this section of the Natural Environment Element. This consideration is reflected in the Goals, Objectives, Policies and Implementation Measures of this section.

G. Conservation Techniques

The most aggressive conservation currently employed by the City is the conversion from a flat rate system to a metered one. This action was initiated by Ordinance 580 (Section 24.281), and will eventually result in a more effective way to monitor water consumption. In addition to increased efficiency, it allows the City to impose a new rate structure based on consumption, which will add a fiscal incentive for conservation.

According to the 1991 Annual Report to the Office of Drinking Water there are currently 3,711 active connections in the system. As of the year end 1991, 2,158 of those connections were on the metered system and the remaining 1,553 still remain on the flat rate system (City of Red Bluff Public Works Department 1992-see above). This process of conversion is expected to be complete within the next ten years (City of Red Bluff Public Works Department 1990).

According to the 1990 Update to the Water Management Plan there are twelve ordinances that address water conservation. The specific issues range from; prevention of waste to recirculating of air conditioner water. The most predominate issue, however, is the above stated conversion of a flat rate to a metered system.

Resolution No. 12-1992 concluded that it is not appropriate at this time for the City of Red Bluff to "...implement the State of California model water efficient landscape ordinance." (City of Red Bluff 1992 (Res. No. 12-1992). Reclaimed water, however, is currently being used as a conservation method by the City. The sewage treatment plant utilizes reclaimed water for landscaping/irrigation purposes. Cal Trans is also utilizing reclaimed for the

landscaping along Highway 5 (City of Red Bluff Public Works Department 1990).

H. Executive Summary

The City of Red Bluff has an excellent source of ground water. The future maintenance of ground and surface water quality depends on many factors, including; the prevention and or mitigation of hazardous waste contamination (of both soil and water resources), watershed protection, prevention of soil erosion, and preservation of recharge areas (through open space).

GOALS

• Promote a continued supply of high quality ground and surface water in the City of Red Bluff.

• Conserve and improve groundwater, natural habitat, mineral, aesthetic, soil and air resources in the Red Bluff Planning Area (Land Use Element).

• Manage the treatment, reuse, removal and disposal of all solid waste generated within the City of Red Bluff (Land Use Element).

OBJECTIVES

• Maintain and protect watershed and recharge areas (including areas important to percolation such as Red Bank and Reed's Creek).

• Preserve and maintain the natural state (including soils and vegetation) in areas where recharge and percolation occur.

• Minimize water waste and runoff in the Red Bluff Planning Area.

• Reduce the amount of sediments entering the waterways in the Red Bluff Planning Area.

• Minimize and mitigate environmental contamination generated by hazardous wastes.

POLICIES

• Encourage all existing and new development (residential, commercial and industrial) to incorporate water conservation methods into plan design so that water waste, use and runoff can be minimized.

• Ensure the continued high quality of groundwater by encouraging projects which minimize soil erosion.

• Restrict and limit, wherever possible, the alteration of natural drainageways and associated vegetation.

• Restrict urban intrusion into floodplains and associated Greenway zones.

• Reduce and minimize the use of paving in recharge areas, both on private lands and in public lands (including rights of way and utility easements).

• Encourage the continued use and development of programs which utilize reclaimed water.

• Educate the public on issues of hazardous waste generation, storage and disposal.

• Limit, and wherever possible disallow the intrusion of industrial and agricultural pollutants into the groundwater table.

• Encourage urban creek restoration (Land Use Element).

• All new residential subdivisions, commercial or industrial land development within the City Planning Area should be contingent upon water and sewer services including sewer, water and emergency vehicle access (Land Use Element).

• Require industry participation in waste treatment and recycling efforts (Land Use Element).

IMPLEMENTATION MEASURES

• Enforce all of the guidelines provided by the Grading, Drainage and Ground Cover Policies and the Land Development Policies.

• Prepare, adopt and implement a household hazardous waste management plan.

• Provide all water customers with a list of common household products which are considered hazardous by the Department of Health Services (see Appendix I).

• Provide all water customers with information regarding the current methods available for disposal and or storage of hazardous waste (Appendix J).

• Require new projects, both private and public, to consider the use of drought-tolerant native vegetation for landscaping purposes.

• Direct residential development, under careful site and project design to areas south of Kimball Road, West of the City outside creek floodways and riparian habitat and to the North, West of the Freeway (Land Use Element).

• Fill materials should not encroach upon floodways, drainageways, protected trees, adjacent lots or properties nor should they create unstable or erodible surfaces (Land Use Element).

NATURAL ENVIRONMENT ELEMENT

VI. GEOLOGY AND SOILS

This section of the Natural Environment Element addresses the general geology and soil types found within the City of Red Bluff Planning Area. Included in soil types are the Department of Conservation's Important Farmland Map Series classifications. Soil erosion is also addressed, as it was determined to be an issue of concern for the City during the scoping phase of this project.

A. Geology

The City of Red Bluff is located within the Great Valley Geomorphic province. The province includes that area known as the Great Central Valley of California and extends 400 miles north to south and 60 miles east to west (Department of Water Resources, 1991, 11). It is encompassed by the Coast Ranges (metamorphic), the Klamath Ranges (metamorphic), the Cascade Range (volcanic) and the Sierra Nevada (granitic and metamorphic).

The majority of rocks and deposits found within the province are sedimentary. The age of these rocks and deposits range form Upper Jurassic to Recent (Department of Water Resources 1991, 11).

The Tehama Formation is a Plio-Pliestocene occurrence that is composed of fluvial sedimentary deposits of "..semi-consolidated pale-green, gray and tan sand, tuffaceous sand, silt, and clay. The formation has scattered, discontinuous lenses of gravel." (Department of Water Resources 1991, pg 13). This semi-consolidated material ranges in depth from 5-40 feet within the formation. The general appearance of the formation is fine-grained (Department of Water Resources 1991, 14.)

The Red Bluff Formation is a Pleistocene occurrence that is composed of coarse gravel and clayey matrix that is brick-red in color. The depth of the formation varies within the unit, with some of the thickest deposits being found in the City of Red Bluff. Here the deposits can be as thick as 30 feet in depth. There are significant erosional remnants of the formation found within the City (Department of Water Resources 1991, 14).

The California Division of Mines and Geology prepared a geologic map which includes the City of Red Bluff in 1962 (most recent reprint completed in 1977). The map is entitled the Redding Sheet and it has a scale of 1:250,000. Although the scale is too small for general planning practices, it provides adequate depth for this purpose. A copy of the map available at the Red Bluff Community Development Department or at the California Division of Mines and Geology (1416 Ninth Street, Room 1341, Sacramento).

B. Soils

There are six major factors that influence and control the characteristics of the soil for any given area, and they are; climate, relief/topography, organic

content, parent material, time, and human activity (Department of Water Resources 1991, 21 and Soil Conservation Advisory Committee 1987, 3).

Most soils have several layers. In areas where there has not been significant disturbance, there are usually three main layers. These layers are commonly referred to as; the surface, topsoil or solum, the subsoil, and the underlying or parent material (Soil Conservation Service 1990, 10). The soil profile refers to the all layers of the soil, from the surface down to the parent material. The characteristics of each layer vary with depth and type.

The following information has been provided by various government agencies and it would be advantageous for the City to consider this information when making land use decisions. The Soil Conservation Service, under the United State Department of Agriculture, prepared a Soil Survey, Tehama County California in May of 1967. This report provides general soil maps (orthophotos) and accompanying text for the entire county. The City of Red Bluff Planning Area is included in four of these maps; sheets 67, 68, 74, and 78.

It has been estimated that there are over 1300 different soil types in the state of California (Soil Conservation Advisory Committee 1987, 3). After examination of the soil maps provided by the Soil Conservation Service, it was determined that there are 37 different soil types within the Red Bluff Planning Area. These soil types, along with their map symbol, acres (county total), and slope percent are identified in Appendix K. A brief discussion of each soil type can be found in the Appendix L. These descriptions were adapted directly from the Soil Conservation Service survey.

Of the 37 soil types identified in the Planning Area, 15 general soil series are represented. These series include; the Arbuckle Series, the Clear Lake Series, the Columbia Series, the Corning Series, the Cortina Series, the Hillgate Series, the Maywood Series, the Nacimiento Series, the Newville Series, the Perkins Series, the Red Bluff Series the Redding Series, Riverwash, the Tehama Series, and the Zamora Series.

C. Agricultural Lands

1) Important Farmland Mapping Series

The California Department of Conservation offers a series of maps entitled the Important Farmland Maps. These maps are part of a statewide Farmland Mapping and Monitoring Program. The purpose of the program is, "..to monitor conversion of the state's agricultural land to and from agricultural use, and to report that conversion annually to the Legislature, local government, and the public." (California Department of Conservation 1984, opening letter). One of the methods by which this task is accomplished is through the preparation of a series of statewide maps entitled the Important Farmland Series Maps.

The base maps used for this series are originally drafted by the United States Department of Agriculture Soil Conservation Service. The maps are then modified to show farmland and urban areas by the California Department of Conservation. Although the primary purpose of these maps is related to

agriculture, they offer valuable information relating to the soils types and land uses within the Red Bluff Area. There are eight different classifications used this series and they include; Prime Farmland, Farmland of Stateside Importance, Unique Farmland, Farmland of Local Importance, Grazing Land, Urban and Built-up Land, Other Land and Land Committed to Nonagricultural Use. These classifications have a minimum mapping unit of 10 acres, with the exception of grazing land, which has a minimum mapping unit of 40 acres.

All eight of the Important Farmland Mapping Series land classifications are found within the Red Bluff Planning Area. The definitions of these classification types, as described by the Department of Conservation, are located in the appendices of the element. For the geographic distribution of these classification types, please see the Important Farmland Map Series, sheet 1 of 3 for Tehama County (scale=1:100,000) or the Red Bluff series (Red Bluff East and Red Bluff West, scale=1:24,000). These maps are available at the Red Bluff Community Development Department. If there are any specific questions or information relating to the updated versions of these maps, please call the Department of Conservation at (916) 324-0859.

The Department of Conservation utilizes the definitions provided by the USDA Soil Conservation Service Important Farmland Inventory System in determining their classification criteria. This interrelationship has resulted in several internal consistencies within the two agencies' findings. One result is the determination of soil candidates for farmland classification (assigned by Department of Conservation) according to their soil mapping unit (assigned by the Soil Conservation Service).

The Department of Conservation prepared a table for soil candidate listings for both the "Prime Farmland" and "Farmland of Stateside Importance". Nineteen of the soil mapping units found in the Red Bluff Planning Area are candidates for the "Prime Farmland" soils classification, and four qualify for the "Farmland of Stateside Importance." See Appendix M for the names of these soils. This listing could be used for cross referencing and location analysis of specific soils.

The fertile soils of the Sacramento Valley and climate provide an unique growing area. These fertile soils are presently under the constant threat of urban development. The above cited Important Farmland Map Series provides scientific information as to the existence and location of agricultural soils within the Red Bluff Planning Area. There is another issue which must be addressed, lands covered by the Williamson Act (otherwise known as the California Land Conservation Act).

2) The Williamson Act

The Williamson Act provides landowners (farmers, ranchers, etc.) and local officials with the legal tools to protect agricultural land. The tool is a ten year, self renewing contract which allows farmers (and other landowners) to maintain specified land use (agriculture, ranching, open space, etc.) in exchange for preferential land assessment for property tax purposes. The City of Red Bluff is currently surrounded by either lands actively under contract or lands of recent contract termination.

The land to the East of the Sacramento River, along the Sphere of Influence periphery and into the Planning Area is encompassed with lands under contract. This pattern follows along to the south of the City and across the Sacramento River to the west.

There are several parcels (two of which are relatively large) under contract bordering Red Bank Creek to the south. Surrounding these active areas, are several parcels that withdrew from the program in 1991. Although Red Bank Creek is the southern boundary of the Planning Area, it would be advantageous of the City to consider this in land use decisions associated with the area.

There is a small parcel under contract, along Reed's Creek to the East of Paskenta Road. There is another parcel bordering this area to the south that was deactivated in 1991. Another, larger parcel exists to the east of Baker Road where it meets Brickyard Creek. The final parcel is to the south of Dibble Creek (and Highway 36) and east of Monroe Avenue. This parcel is also large and is bordered to the east by more Williamson Act lands.

D. Soil Erosion

There are two general types of erosion; geologic and accelerated. Geologic erosion is more or less a natural type of erosion that occurs at a very slow rate. This type of erosion is not usually associated with areas where human activity takes place (Soil Conservation Service 1990, 7). The process of accelerated erosion is influenced and perpetuated by human disturbance and is therefore an issue of concern for the purposes of the Natural Environment Element.

Accelerated erosion is the result of many anthropogenic activities, including; logging, bulldozing (for urban development), overgrazing, and expansion of agricultural lands. There are ways to modify the effects of these activities on soil erosion. However, before solutions can be addressed it is important to examine the forces behind the problem.

There are four major properties of the soil which can be used to determine its erodibility. These properties are; **texture, slope, structure** and **organic matter content** (Soil Conservation Service 1990, 10).

Texture, is generally considered as the most important property for purposes of soil erosion. Texture identifies the relative proportion of particles within the soil. The particles are classifies by size and include, sand, silt and clay (Soil Conservation Service 1990, 10).

Slope is the relative steepness of the ground surface. As the steepness of slope increases, so does the potential for erosion. After disturbance, steep slopes are especially susceptible to the erosive forces of water. The steeper the slope the more erosivity of runoff and the bonds of soil particles begin to break more actively (Soil Conservation Service 1990, 10-11).

The **structure** of the soil is the way in which soil particles are clustered. These clusters are the result of both physical and chemical bonds.

These bonds form aggregates, which in turn form peds. Peds are visible clumps of soil that have similar size and range in undisturbed areas. However, as disturbances occur, the peds are broken down (and sometimes built up) and this consistency is lost (Soil Conservation Service 1990, 11).

Organic matter is the, "..decomposed remains of plants and animals." (Soil Conservation Service 1990, 12). This property of soil influences; soil fertility, water infiltration and storage, soil structure and erodibility. Humans can, and do increase the amount of organic matter of soil. It can be used as a means to repair soil already damaged by erosion. It is however, a slow process (Soil Conservation Service 1990, 11).

Soil erosion poses many problems and hazards for an urban community, including but not limited to; an increase in sediment load of surrounding waterways, degradation of surrounding vegetation, loss of fertile topsoil, and the accumulation of silt on sidewalks and roadways.

There are several areas in Red Bluff which exemplify the problem of soil erosion. The slope on the east side of South Main from Diamond Avenue to the Interstate 5 is one example. The efforts to seed this area were unsuccessful, and as a result the soil is continually be degraded by water and wind. The Willow Creek subdivision, currently being constructed, off of Luther Road is another example. Large amounts of fertile topsoil have been displaced as a result of grading. These areas, when left exposed, are undergoing erosion and creating the potential for future environmental hazards.

The Willow Creek subdivision is currently under construction and there is still an opportunity to mitigate the problems associated with soil erosion. The Fairway Oaks development, just south of Willow Creek on South Jackson, reflects what can happen when soil erosion is not properly mitigated. This subdivision, including the surrounding easements, provides an example of the type of soil damage that can occur. This type of soil damage, when properly considered and managed during the design stages of a project, can be effectively mitigated.

One way to determine the erosion potential of a soil, is to utilize the USDA Soil Conservation Service's capability classification for soil types. The basic purpose for this classification method is to determine agricultural suitability. There is a subclassification, e, however, which indicates the limitations of the soil due to erodibility. There are ten soil types in the Red Bluff Planning Area which have been categorized under this subclassification (e). These soils are presented in Appendix N. An on site evaluation of soil type would be a more accurate way to determine erosion potential.

E. Executive Summary

Soil is a basic resource which directly and indirectly influences other resources within the Red Bluff Planning Area. The condition of the soil directly affects the health of associated vegetation and wildlife species. The degradation of soil resources adversely affects agricultural practices. Accelerated soil erosion poses many environmental hazards,

including; degradation of water quality, soil sterility, desertification, increased sedimentation of streams, and safety hazards.

Proper planning and mitigation can help prevent and or lessen some of the soil hazards associated with urban development. In some cases this mitigation can be as simple as seeding exposed slopes, and the result is long term protection of a valuable resource.

The purpose of the following goals, objectives, policies, and implementation measures is to provide the guidelines for soil preservation and protection. Some of the policies found in the Red Bluff Land Development Policies and the Grading, Drainage and Ground Cover Policies are incorporated into this section. A list of more specific preservation methods and on site construction techniques is currently being prepared by the Planning Director and myself.

A potential for the degradation of soil resources through hazardous waste contamination does exist in the City of Red Bluff. This type of contamination also has the potential for water pollution and is addressed in the Water Resources section of the element.

GOALS

- Conserve and protect the soil resources of the Red Bluff Planing Area.

- Ensure and encourage the continued production of agricultural products.

- Conserve and improve groundwater, natural habitat, mineral, aesthetic, soil and air resources in the Red Bluff Planning Area (Land Use Element).

OBJECTIVES

- Prevent and mitigate all human induced soil erosion occurring within the jurisdiction of the City of Red Bluff..

- Protect the remaining important agricultural soils within the Red Bluff Planning Area, as identified by the Department of Conservation's Important Farmland Map Series (1:24,000)..

POLICIES

- Restrict development in areas of unstable soils.

- Encourage that all graded areas be seeded with vegetation deemed acceptable by the conditions provided by staff.

- Prepare and adopt hillside development standards, as designated by the Land Use Element.

• Direct urban development to areas of non-prime soils and encourage cluster development in areas surrounding prime agricultural soils to create a buffer.

• Discourage further development on prime agricultural soils and within riparian habitat, woodland, scenic areas and designated wetlands to preserve urban area environmental resources (Land Use Element).

IMPLEMENTATION MEASURES

• Enforce any and all of the 123 conditions and findings relating to soil preservation as presented by the City of Red Bluff.

• Implement and enforce ALL guidelines and restrictions of the Land Development Policies and the Grading, Drainage and Ground Cover Policies.

• Require an on site soil survey for all developments occurring on soils that have been given an e (erosion risk) subclassification by the USDA Soil Conservation Service's capability classification.

• Require that all new developments over 10 acres in size and or exceeding low density classification present an erosion control plan that has been approved by a certified soil erosion prevention specialist.

NATURAL ENVIRONMENT ELEMENT

VII. ATMOSPHERIC RESOURCES

A. Introduction

The City of Red Bluff is located within the Sacramento Valley Air Basin, which is a large area that has been divided into a smaller division referred to as the Northern Sacramento Valley Air Basin(NSVAB). This basin includes the counties of; Butte, Colusa, Glenn, Shasta, Sutter, Tehama, and Yuba.

The Northern Sacramento Valley Air Basin is bordered by physical barriers, which create a "bowl" type basin. The barriers include; the Coastal Mountain Range to the north and west, the Cascades (southern portion) and the Sierra Nevada Mountains (northern portion) to the east. The floor of the basin gradually slopes upward from the south to the north. To the south and southwest, there are two air basins which generate high amounts of ozone and it precursors; The Broader Sacramento Area and The San Francisco Bay Area Air Basin.

The pollutants from The Broader Sacramento Area Air Basin and The San Francisco Bay Area Air Basin are of concern to the NSVAB, and the City of Red Bluff for two reasons. The first reason is wind carried transport of pollutants. The influx of marine air into the Bay Area carries the pollutants on to the Carquinez Strait, where they will continue on to Sacramento. The prevailing northerly winds will then carry these pollutants up into the NSVAB. The second reason of concern is the physiography of the basin itself. The "bowl" type terrain acts a trap for the pollutants. It traps not only the pollutants generated within the basin, but also the pollutants transferred by winds from the more populous areas to the south.

B. Air Quality Monitoring

There are two primary agencies involved in monitoring air quality within the Red Bluff Planning Area. These agencies are; The California Air Resources Board and The Tehama County Air Pollution Control District. The California Air Resources Board monitors area and mobile pollution emissions and the Tehama County Air Pollution Control District monitors stationary sources. The Tehama County Air Pollution Control District is also responsible for the management of the air quality plan for the area, which includes the discretionary functions associated with permit issuance.

1) State Monitoring

The California Air Resources Board prepares a statewide report entitled, California; Air Quality Data on a quarterly and annual basis. The most recent of these reports available, is the July-August-September 1991 quarterly report. These reports are prepared specifically by the Air Resources Board Technical Support Division and they assesses air quality for each of the 14 air basins in the state (California Air Resources Board 1990, 16).

The quarterly reports assess 19 pollutants for over 120 areas throughout the State. Theses pollutants include; ozone, carbon monoxide, nitric oxide, nitrogen dioxide, oxides of nitrogen, sulfur dioxide, total hydrocarbon, methane, particulate matter (10 microns), particulate sulfate (10 microns), particulate nitrate (10 microns), particulate chloride (10 microns), particulate ammonium (10 microns), total suspended particulates, suspended particulate lead, suspended particulate sulfate, suspended particulate nitrates, soiling index (coefficient of haze), and hydrogen sulfide. Future copies of this report may be acquired by calling (916) 322-2990 (California Air Resources Board 1991).

2) Regional Monitoring

In 1991, the Northern Sacramento Valley Air Basin 1991 Air Quality Attainment Plan was prepared. The purpose of the plan is to comply with and attain ambient air quality standards designated by State and Federal Law. This plan was the result of a joint effort by air quality pollution control districts and air quality management districts for the counties of; Shasta, Tehama, Glenn, Butte, Colusa, Sutter and Yuba.

The plan indicates which counties have been designated "attainment" and "non-attainment" areas by the State. These classifications are based on standards for the four criteria pollutants established by the California Clean Air Act of 1988. These pollutants are; ozone, nitrogen oxides, carbon monoxide, and suspended particulate matter less than 10 microns in diameter (PM10).

All of the counties in the NSVAB, including Tehama, have been designated as a non-attainment areas for two of the criteria pollutants; ozone and PM10. The non-attainment status, however, can be misleading as indicator for air quality. Misleading because any county which exceeds the state air quality standards for a minimum of one hour is classified as non-attainment for an entire year. A good example of how this status can be deceptive is the fact that Los Angeles County and Tehama County are both non-attainment areas for ozone.

There are two monitors in Tehama County which measure these "non-attainment" pollutants. Both monitors are located within the Red Bluff City limits. The ozone monitor is located just off of Highway 5 on the roof of the sewage treatment plant. The PM10 monitor is located behind the Tehama County Air Pollution Control District office 1750 Walnut Street. The PM10 monitor is owned by the State (Air Resources Board), on loan to the district and the ozone monitor is owned by the district (Williams 1992).

The Tehama County Air Pollution Control Board is currently performing a study on ozone levels in Red Bluff. The purpose of the study is to determine the major sources of ozone pollution. It is generally accepted that the majority of ozone in Red Bluff is created by automobile emissions. The controversy is over where those emissions are generated within the City, transported in from other areas, or produced by the highways corridors which bisect the city (Bovee 1992).

Background information and associated health affects of the two non-attainment criteria pollutants; ozone and PM10 are listed below. The most recent ozone and PM10 data are presented in Appendix O.

C. Criteria Pollutants

The following information was provided by the Northern Sacramento Valley Air Basin 1991 Air Quality Attainment Plan. According to the plan, Tehama County has a "non-attainment" status for ozone and particulate matter less than 10 microns in diameter (PM10).

1) Ozone

Ozone (O^3) is a secondary pollutant. Secondary, in that it is not directly emitted into the atmosphere, but is the result of a chemical reaction that occurs between nitrogen oxides (NOX), reactive organic gases (NOG) and sunlight. Nitrogen oxides are emitted into the air as a result of fuel combustion at high temperatures (the burning of gasoline in automobile engines). Reactive organic gases are emitted into the air in two ways; as the result of fuel combustion and through the evaporation of organic solvents. Once present in the atmosphere, a photochemical reaction occurs and ozone is formed (NSVAB Air Pollution Control and Quality Management Districts 1991, 8-9).

Ozone is considered a seasonal problem in the Northern Sacramento Valley Air Basin (NSVAB). The season of peak concern is normally April through October. The NSVAB shares the Sacramento Air Basin with the Broader Sacramento Area (BSA) which adds to the atmospheric content of ozone. The Broader Sacramento Area emissions are transported by the prevailing winds north, into the NSVAB (NSVAB Air Pollution Control and Quality Management Districts 1991, 8).

There are several health affects associated with Ozone. The majority of these affects on humans, are related to the respiratory system. Low concentrations of ozone can cause a decrease in the amount of air allowed to pass through the lungs. This is the result of increased in resistance to air passage within the tissue of the lungs. At higher concentrations, ozone can cause severe damage and premature aging of lung tissue. A research project sponsored by the Air Resources Board and the University of Southern California demonstrated that there is a connection between ozone exposure and the deterioration of the alveoli.

Pre-existing health problems are also aggravated by exposure to ozone. For example, the adverse affects of asthma, bronchitis, eye irritation and cardiovascular disease can be increased by the exposure to ozone. At high levels of ozone concentration, people with respiratory and cardiovascular difficulties, become increasingly susceptible to these affects. This is especially true for the elderly, children and pregnant women. Ozone, however, can have adverse affects on people of all ages and physical conditions. Some of the more common affects include; nauseous, dizziness, headaches, coughs, and burning sensations in the chest area (NSVAB Air Pollution Control and Quality Management Districts 1991, 9).

2) Suspended Particulate Matter

Suspended particulate matter, for the purposes of this element will be those particulates with a diameter of 10 microns or less, otherwise known as PM10. The primary components of these particulates are; dust, nitrates, and sulfates. The production and release of these products into the atmosphere is a result of fuel combustion and abrasion. The automobile engine is one source of combustion, and tire and brake linings are examples of abrasion. PM10s are also released through chemical reactions (NSVAB Air Pollution Control and Quality Management Districts 199, 10).

PM10s can cause adverse health affects in humans. The small size of the particulates enables them to pass through the natural defense mechanisms and mucous membranes of the body and enter the lung tissue. Once present in the lungs they can cause damage to the alveoli. Toxic compounds (such as carcinogens) can attach to the surface of the particulates, thereby providing direct transport to the lung tissue (NSVAB Air Pollution Control and Quality Management Districts 199, 10).

Larger particulates (with a diameter of more than 10 microns) do exist and can cause irritation of the throat, nose and bronchial tubes. The natural defense mechanisms of the body, such as sneezing, however, normally protect the body from serious damage caused by these larger particulates.

D. Facility Emissions

The California Air Resources Board prepared a study entitled, Emissions By Facility Summary(1989 Draft Emission Inventory) for the Tehama Pollution Control District. As of this time, these figures have not been formally adopted. The tentative results of the study presented eight facilities in the City of Red Bluff that were under operation and emitting pollutants into the atmosphere.

Of the eight facilities emitting pollutants, six currently are currently in operation. The six facilities are; Diamond International Corporation (on Reed Avenue), Packaging Company of California (on Diamond Avenue), Louisiana Pacific Corporation (on Reading Road), Fiber Enterprises (on Vista Way), Al Bon Company (Highway 36) and Crown Plastics (on Vista Way). See Appendix P for emissions data.

The industrial facilities in Red Bluff contribute only a minor amount of air pollutants. The most critical sources are automobile emissions (Ozone) and agricultural practices (PM10) (Bovee 1992).

E. Executive Summary

The major cause of air pollution in the City of Red Bluff is vehicle emissions (ozone). The specific source of the pollution (locally generated, transported, or generated by highway corridor) has not been determined. The Tehama County Air Pollution Control Board is actively studying this problem and will have the results in the future. Once these findings are approved, they should be incorporated into this section of the Natural Environment Element.

It is also recommended that the City modify the goals, objectives, policies, and implementation measures of this section to reflect these findings.

Other sources of air pollution in the Red Bluff Planning Area include the industrial facilities cited above (PM10 and Ozone), the exposure of unconsolidated soil to wind (PM10) and agricultural practices (PM10). These issues are addressed below, with the exception agriculture. The majority of agricultural practice occur beyond the City Limits and are therefore out of the control of the City.

GOALS

- To achieve and maintain high standards of air quality within the City of Red Bluff Planning Area.

- Provide a healthy environment for all current and future inhabitants of the City of Red Bluff Planning Area.

- Increase use of alternative transportation modes (Circulation Element).

OBJECTIVES

- To achieve and maintain "attainment area" status for all of the four criteria pollutants, as designated by the State of California Air Resources Board.

- Reduce Average Daily Traffic (ADT) trips (Circulation Element).

- Promote the safety of pedestrians and cyclists on streets and roadways (Circulation Element).

POLICIES

- Encourage activities that decrease vehicular emissions, including; the safe use of bicycles, carpooling and mass transit.

- Discourage the establishment of business and or other activities which promote and or add to the degradation of air quality.

- Provide setbacks, landscaping, sound walls, and other barriers to protect adjacent land uses from noise, air pollution, and safety impacts from traffic where appropriate (Circulation Element).

- Promote use of bicycling and walking as an alternative to automobile use (Circulation Element).

- Promote the use of car and van pooling (Circulation Element).

- Encourage employers to advocate employee use of fuel-efficient transportation (Circulation Element).

• Develop alternate through-routes in downtown area in order to decrease the high concentration of emissions (Circulation Element).

• Separation of bicycle and pedestrian traffic from vehicular traffic should be encouraged, especially near schools (Circulation Element).

• Bicycle lanes should be included in construction or upgrade of roads, overpasses, and bridges (Circulation Element).

• New bicycle lanes should be connected with the existing bikeway system wherever feasible (Circulation Element).

• Existing bicycle facilities should be maintained and upgraded, and new ones added as needed (Circulation Element).

IMPLEMENTATION MEASURES

• Require all new businesses which have a potential for air pollution to submit a report which addresses anticipated emissions and alternatives.

• Implement the trail system introduced in the 1974 Parks and Recreation Plan.

• Implement all of the guidelines that reduce soil erosion and exposure as provided in the Land Development Policies and the Grading, Drainage and Ground Cover Policies.

• Develop a Transportation System Management (TSM) ordinance to promote flex-time, vanpools, bicycling, and other alternative transportation methods to employment destinations (Circulation Element).

• Develop and adopt a TSM ordinance with provisions to promote bicycling and walking as methods of transportation (Circulation Element).

• Identify and develop new bicycle and pedestrian trails, especially in areas surrounding schools, shopping areas, and employment centers (Circulation Element).

• Require separate bicycle and pedestrian lanes in each direction on any new arterial street (Circulation Element).

• Require new development and redevelopment to include bicycle routes (Circulation Element).

• Identify and develop potential locations of park-and-ride lots, especially near Interstate 5, Highway 36E, and Highway 99 (Circulation Element).

• The City should update and adopt the existing bicycle route plan (Circulation Element).

• The City should develop and adopt standards for the provision of bicycle parking facilities for public and private development (Circulation Element).

NATURAL ENVIRONMENT ELEMENT

VIII. MINERALS

A. Introduction

The Tehama County General Plan, adopted in 1983 provides an informative and general assessment of the mineral resources found within the county. The information provided in this plan is summarized in the following paragraphs.

Aggregates, including; non-metallic sand, gravel, and volcanic cinder account for the majority of mineral extraction activity in the county. These materials are typically used for construction and paving purposes. The high costs of transportation and the heavy weight and bulk of aggregates ensures that the preponderance of these materials are used for local project. Mineral extraction and construction account for approximately 4% of current employment in the county. (Tehama County 1983 111-50,51).

Although mineral extraction is somewhat limited, there is the potential for future expansion. This expansion would be controlled by both resource availability and future demand. Fourteen other mineral resources have been identified in the County by the California Division of Mines and Geology, Minerals of California; Bulletin No.189. These minerals include; aragonite, borax, chalcopyrite, chromite, copper, cristobalite, galena, garnet, opal, pectolite, penninite, sassolite, and Wallsonite (Tehama County 1983).

The most plausible mineral for future development is chromite. Chromite is used for steel production. The demand for domestically mined chromite is currently at a lull, given that the majority of the country's supply is imported (Tehama County 1983). Most of the chromite deposits are found in the western section of the county and would therefore have little or no effect on the City.

B. Local Extraction

The California Office of Mines and Geology maintains a database entitled Mine Files which includes an inventory of mining activity on a county wide basis. According to this source there are 62 mine sites located within Tehama County. These sites vary in activity status from abandoned to active.

There were four permits granted in the Red Bluff Planning Area for mineral extraction. Reflective of the county, all were for aggregate extraction. The four extraction sites were located along four creeks; Red Bank Creek, Reed's Creek, Dibble Creek, and Blue Tent Creek (Brewer 1992). The operation of Red Bank Creek has been abandoned. The Reed's Creek, Dibble Creek, and Blue Tent Creek operations are currently active, although do not operate on a year round basis. The site on Reed's Creek is owned by Sale Truck Repair. The Dibble Creek site is owned by Al-Bon Corporation. The Blue Tent Creek site is owned by Elmer Heightman and extraction is minimal and intermittent at best.

The Surface Mining and Reclamation Act provides the legal regulations and guidelines for extraction operations. As part of the Act, a permit application and review process is mandated for each extraction activity. This permit procedure is governed by the lead agency. All three sites are governed by the County. The Dibble Creek mine is the only site currently located within City Limits. The permit for this site was originally filed with the County, and the land was later annexed into the City. The Blue Tent Creek site borders the City Limits, however, the application is on file with the County.

C. Executive Summary

None of the extraction activities located within the Planning Area fall under City jurisdiction. As the City continues to grow, however, some of these sites may be annexed into City Limits. There is also current undeveloped potential for extraction within the City Limits. The City should take advantage of this situation and prepare for future mineral extraction practices.

The following goals, objective, policies and implementation measures are intended to provide guidelines for future extraction activities within the City Limits. The Surface Mining and Reclamation Act (SMAR) will also function as guide. The administration of the policies contained within this section and SMAR are the responsibility of the City.

GOALS

- Conserve the mineral resource base in the Red Bluff Planning Area.

- Conserve and improve groundwater, natural habitat, mineral, aesthetic, soil and air resources in the Red Bluff Planning Area (Land Use Element).

OBJECTIVES

- Utilize mineral resources, where extraction is deemed to have a mutually beneficial impact on the community (both environmentally and economically).

- Maintain and apply all government plans and restrictions to all active mineral extraction activities in the Red Bluff Planning Area.

POLICIES

- Discourage extraction in environmentally sensitive areas, including those areas designated by other elements of the general plan.

- Encourage the reclamation of mined lands for recreation, aesthetic, open space or other public purposes.

- Review and update all City ordinances which address the extraction of mineral resources on a regular and as needed basis.

• Ensure the protection of all non-mineral resources surrounding the site of a proposed mineral extraction area

• Require that the City monitor the environmental impacts of current and future mineral extraction activities and ensure proper mitigation for adverse affects.

IMPLEMENTATION MEASURES

• The City shall prepare and adopt a mineral extraction plan, as detailed in the Open Space Action Program of this element.

• Require a reclamation plan with each new application for a mineral extraction permit, as mandated by the Surface Mining and Reclamation Act of 1975.

• Require that all land use conflicts associated with mineral extraction be determined, considered, and mitigated in verbal and written form (conditions for approval) during the decision making process.

NATURAL ENVIRONMENT ELEMENT

IX. OPEN SPACE

A. Introduction

Open Space as defined by the State of California is, "...any parcel or area of land or water which is essentially unimproved and devoted to an open-space use..." (Governor's Office of Planning and Research 1992, 37). There are four types of open space use recognized by the State, and they are; open space for the preservation of natural resources, open space used for the managed production of resources, open space for outdoor recreation, and open space for public health and safety.

Currently, there is not an "open space" zoning classification in the City of Red Bluff. All of the city owned land is zoned under a general PS-Public Service. Public parks and recreational areas are included under this zoning classification, as is the land surrounding the airport and the sewage treatment facility. There is a subclassification, f-floodplain, under the PS zoning which indicates a more specific land use.

The following sections address the current and future possibilities for implementing the four State recognized types of open space.

B. Open Space for the Preservation of Natural Resources

This type of open space use includes areas, "...required for the preservation of plant and animal life,...for ecologic and other scientific study purposes,...rivers, streams,...banks of rivers and streams, and watershed lands." (Governor's Office of Planning and Research 1992, 37).

Greenways, an overlay zone initiated by the Land Use Element, would qualify for this type of open space. Greenways are defined as, "...continuous canopy of woodland which is found along and with varying distance adjacent to stream corridors or wetlands." (Collins 1992, 52). The purpose of Greenways is to preserve natural resources found within these wooded areas. The result is open space, which provides many assets including preservation of; habitat, soil stability, and aesthetic and recreation resources.

Designated open space areas for the preservation of natural resources can have dual purposes. Quite often the preservation of natural resources, such as vegetation, soil, and air quality has a positive impact on other resources. For example, by protecting riparian habitat we can increase; bank stability, water quality, aesthetics, recreation and provide valuable habitat for wildlife.

It is important to identify areas of high resource value, so that they may be protected and growth can be guided into more suitable, less abundant areas.

C. Open Space for the Managed Production of Resources

This type of open space use includes, "...forest lands, rangeland, agricultural land,...areas required for recharge of ground water basins,...areas containing major mineral deposits." (Governor's Office of Planning and Research 1992, 37).

There is no zoning classification for this type of open space, at present in the City of Red Bluff.

There are areas of prime agricultural soils in the Planning Area, as indicated in the Geology and Soils sections of this element. The current production of food and fiber within the City Limits, however, are relatively small in scale and have little direct importance to the City (Collins, 1992 17). The surrounding, rural areas, of the county provide an environment more conducive to large scale agricultural practices. In accordance with the Land Use Element, it should be the policy of the City to take County farmland preservation methods under consideration when making land use decisions.

There is only one active mineral extraction facility located within the Red Bluff City Limits. This site is owned by the Al-Bon Corporation and is located on Dibble Creek. The mine site was originally located in Tehama County, when the extraction permit was filed. The land was later annexed into the City. The mine type, as classified by the Office of Mines and Geology, is a gravel bar skimming operation. The mine produces sand and gravel (Office of Mines and Geology, 1992).

There are other sand and gravel extraction activities located near the City Limits. There is one site just east of Paskenta Road on Reed's Creek. There are also several abandoned and intermittent mining activities located near city limits. The Surface Mining and Reclamation Act provisions mandate that the lead agency take responsibility for permit application and approval process. These other sites, being located in the County, would therefore be out of City jurisdiction.

It is imperative to preserve not only the sand and gravel resources, but the watershed from which they are generated. A holistic view of this type of extraction would be beneficial, both from an economic and environmental stand point.

D. Open Space for Outdoor Recreation

This type of open space use includes, "...areas of outstanding scenic value, historic and cultural value; areas particularly suited for park and recreation purposes, including access to lakeshores...rivers and streams; and areas which serve as links between major recreation and open-space reservations, including utility easements, banks of rivers and streams, trails.." (Governor's Office of Planning and Research, 1992 37).

The City of Red Bluff currently has over 80 acres of park and recreational land (Collins, 1992 31). In 1974, the City hired Nickolas von Rotz, Jr. (a park planning consultant) to prepare the Red Bluff Park System General Plan. The

plan was completed in October of 1974. The plan cataloged eight park facilities, of which most already existed and some were anticipated for future development and or expansion. The plan also addressed a bike trail system that was to be implemented. Although the plan is currently out of date, it does provide maps of each facility.

The updated Land Use Element, prepared in 1992, accurately assesses the current park and recreational facilities available in Red Bluff. The element identifies and describes the following ten park and recreational facilities; Samuel Ayer and Dog Island, Trainor Park, Diamond Park, Forward Park, River Park and Marina, Campfire Recreation Area and Building, Carl Coleman Tennis Courts, Jackson Heights Park, Lincoln Street Tennis Courts, and Luning Street Park. For further information, see the Land Use Element and Map.

In 1991 Bryan Murphy Associates, Inc. prepared the City of Red Bluff Master Plan. The purpose of the plan was to assess current and future infrastructure needs, in order to develop a capital improvement program for the City. The Master Plan concluded that "The City has ample parks and recreational facilities due to forward planning by the City Council and Administration in the past." (Bryan Murphy, 1991, 2-25). This conclusion was based on a per capita ratio of facility availability. The current ratio exceeds 6 acres per 1,000 people. According to standards recognized by the Greenbelt Alliance, this ratio is considered adequate for an urban environment.

In a recent publication entitled, Bay Areas Public Lands, the Greenbelt Alliance identifies the people to city owned acres ratio for all of the municipalities in the Bay Area. In this report, they also present a ratio they deem adequate for city park acres per population. This ratio is 3-5 city park acres per 1,000 people (Greenbelt Alliance 1992, 8). The City of Red Bluff exceeds the low end of this standard by almost 100%. According to a linear regression model of future population growth, the City will not exceed these standards in the next ten years. See Appendix Q.

Future open space areas for the purpose of recreation are therefore considered a lower priority, when compared to the other three types of open space. The City can secure and maintain this satisfactory ratio by encouraging the inclusion of open space areas in new developments. This technique would alleviate the burden for the City to maintain these areas, while securing that these areas will exist. There are currently standards for lot coverage (% of required open space) and children's play areas in the Land Development Policies (section IV and V. B.), which are discussed further in the Open Space Action Program.

E. Open Space for Public Health and Safety

This type of open space includes, "...areas which require special management or regulation because of hazardous or special conditions such as earthquake faulty zones, unstable soil areas, floodplains, watersheds, areas presenting high fire risks, areas required for the protection of water quality and water reservoirs and areas required for the protection and enhancement of air quality." (Governor's Office of Planning and Research 1992, 33).

There are currently two overlay zones which could be included in this type of open space. They are floodplain (f) and Hillslope (H). Both of these overlay zones were dictated by the Land Use Element.

Floodplain overlay districts correlate with the 100 year floodplain as designated by the Federal Emergency Management Agency (FEMA). These areas are delineated on the City's Land Use Map. The purpose of this overlay is to limit and or condition any development within the floodplain for public safety purposes. The most predominant floodplain is located along the Sacramento River. There are also designated floodplain areas along the creeks which run through the City. These areas vary in width from approximately 2000 feet along Red Bank Creek, 1000 feet along Grasshopper, Dibble and Blue Tent Creeks, and 100 to 500 feet along Reed's, Brickyard and Brewery Creeks. (Collins 1992, 9).

Hillslope overlay districts occur in areas where slope exceeds 20 percent. The purpose of this type of overlay is to restrict and or modify development in these unstable areas. This is accomplished by requiring special use permits on a project by project basis within the zone. The development density is also regulated in these areas, in order to provide for public safety (Collins 1992, 9).

These two overlay zones represent the extent of open space designated for the purposes of public health and safety in the City of Red Bluff. These zones, although beneficial do not always qualify as open space. According to State Law, in cases where restricted development is allowed, these areas cannot be considered open space.

Included in the State's definition of open space, is the protection and maintenance of water quality. At present, the City of Red Bluff has an excellent source of groundwater. It is important that the City maintain this resource, including surface water. It would be advantageous for the City to consider an open space zoning classification which provides for this type of protection. In doing this, the City could accomplish many diverse objectives, including the preservation of; vegetation, stream banks, soils, recreation areas, aesthetics and wildlife habitat. This issue is addressed at further length in the Water Resources section of this element, and in other elements of the general plan.

The Safety Element addresses the natural hazards of the community at more depth. The scope of the Safety Element includes: "...the protection of the community from any unreasonable risks associated with the effects of seismically induced surface rupture, ground shaking, ground failure, tsunami, seiche, and dam failure; slope instability leading to mudslides and landslides, subsidence and other geologic hazards....flooding; and wildland and urban fires." (Governor's Office of Planning and Research, 1992, 25).

F. Executive Summary

The City of Red Bluff has many valuable areas of open space. It is important that these areas be considered and protected while population and urbanization continues. Section X., Open Space Action Program, provides specific guidelines for the preservation, conservation and management of open space. This action program is required by State Law and functions as the goals, objectives, policies, and implementation measures for the open space section.

NATURAL ENVIRONMENT ELEMENT

X. OPEN SPACE ACTION PROGRAM

A. Introduction

It is the intent of the Natural Environment Element to satisfy the statutory requirement of the Open Space Element of a general plan. In order to secure the legal viability of this element, it is imperative that an action program be included.

Article 10.5 of California Government Code requires that, "Every local open-space plan shall contain an action program consisting of specific programs which the legislative body intends to pursue in implementing its open-space plan." (Governor's Office of Planning and Research, 1992, 34).

B. Existing Methods for Implementation

The following section discussed techniques currently available for the preservation of open space. The techniques are broken down into the four open space types.

Preservation of Natural Resources

The updated Land Use Element initiated two overlay zones which can be utilized to implement this plan. The zones are Greenways and floodplains, and they are delineated on the Land Use Map. These zones mandate additional restrictions for development and the Planning Commission is granted the power to restrict development all together.

The Land Development Policies, Section IV. Lot Coverage provides guidelines for the minimum amount of open space according to zoning district. The stated purpose for this type of open space regulation is to, "...(increase) rainfall infiltration and (reduce) storm runoff..." (Collins 1992, 5). The minimum open space is determined on a percentage basis (of total land area) and is as follows:

Zoning District	Minimum Open Area
R-1	50%
R-2	40%
R-3	33%
R-4	25%

source: Land Development Policies
Collins, William 1992, 5

Managed Production of Resources

There are no methods currently available for this type of open space preservation. Potential types of resource production in the Red Bluff Planning Area include agriculture and sand and gravel extraction. Large scale agriculture is not a feasible

type of resource production for an urban city, and therefore no future provision for this type of open space are made in this program.

Sand and gravel extraction is a potential source of managed resource production for the City. Technique #2, cited below, proposes a potential solution for future development.

Outdoor Recreation

The Land Use Element's Land Development Policies, Section V. Lot or Site Improvement, subsection B. Children's Play Areas provides guidelines for the inclusion of open space into residential developments. The guidelines apply to development projects of medium density or greater. The power to enact these provisions rests with the Planning Commission, as they are not arbitrary requirements.

Public Health and Safety

The Greenway and floodplain overlay zone, cited above, qualifies as an implementation tool for the preservation of open space for public health and safety. Projects located within the zone are subject to specific development policies (as mandated by the Land Development Policies and the Land Use Element). A stated purpose of both zones is to limit the effects of flooding on public safety. In addition, the Greenway zone is intended to decrease the potential for fire hazard.

The Land Use Element dictates standards for development on hillsides exceeding 20% slope. These areas are designated as Hillslope (H) and require a special use permit for any type of development.

The Clear Zone (CZ) is an overlay zone which extends 1300 feet from the ends of the principal runways at the Bidwell Municipal Airport. The zone is mandated in the Airport Land Use Plan and is delineated on the Land Use Map. Development is restricted in this area and it supersedes existing zoning districts in that area (Collins 1992, 10).

C. Suggested Revisions of Existing Techniques

Revision #1: Incorporate minimum lot coverage standards for all zoning classifications into section V. of the Land Development Policies.

The inclusion of all zoning classifications into this section, will provide a more comprehensive, far reaching form of open space preservation.

Revision #2: Interpret the Greenway and floodplain overlay zones so that they included specific development standards.

There are no specific standards associated with the Greenway overlay zone. Not all floodplain overlay zones are delineated on maps. Currently, the Planning Commission has the responsibility of determining and enforcing the guidelines for development in these sensitive areas. Establishing a list a detailed standards for each zone further secures their effectiveness as preservation tools.

D. New Techniques for the Preservation of Open Space

Technique #1: Prepare and adopt a city ordinance in accordance with the Quimby Act.

The Quimby Act (Government Code Section 66477 et seq) provides a method by which a local government can exact either land dedication or in lieu of fees for park and recreational purposes. The details and limits to this program can be found on pages 147-150 of the 1992 Planning, Zoning, and Development Laws.

There are several advantages to adopting this type of ordinance. It will help to secure that the City maintains an acceptable ratio of park land/population. The current ratio is 6.3 acres/1,000 people. If the present inventory of open space (for recreational purposes) remains constant, the ratio will decrease to 4.77 acres/1,000 people by the year 2002. See Appendix Q for the statistics.

One possibility is to collect "in lieu of fees" until there is adequate to money to purchase vacant land adjacent (or near) the developing area. The land could be left in its natural state, which would lessen the future fiscal responsibilities of the City. This type of open space could, depending on location, function as one or more types of open space under State classifications.

Technique #2 Prepare and adopt a resource extraction plan for the City.

This plan should address areas of potential open space for the purposes of sand and gravel extraction within the City. The areas should be assessed based on environmental, social and economic impacts. Intergovernmental agency coordination should be an implicit part of the plan.

The plan should also include any other potential extraction activities located in the Planning Area. Once complete, the plan will serve as a guide for all extraction practices within the City jurisdiction.

E. Executive Summary

The revisions and new techniques presented in this action program should be implemented immediately following the adoption of the Natural Environment Element. They, in addition to the goals, objectives, policies and implementation measures presented in other sections of the element, should be actively enforced and monitored to ensure compliance. The proper administration of these programs and policies is vital to the cumulative effectiveness of the element.

XI. GLOSSARY

Aggregate (soil)-Many fine particles held in a single mass or cluster, such as a clod, crumb, block or prism.

Alveoli-the individual sacs in the lung where the exchange of oxygen and carbon dioxide between the and blood takes place.

Anthropogenic-involving the impact of humans, induced or altered by the presence of humans.

Aridic (torric) soil moisture regime-soils with this moisture regime are generally found in arid climates with hot and dry summers.

Broader Sacramento Area (BSA)-consists of the counties of El Dorado, Placer, Sacramento, Solano, Sutter, Yolo, and Yuba.

Calcareous-consisting of or containing calcium or any calcium compounds.

Clay-As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Cryic-the mean annual temperature is higher than 0°C (32°F), but lower than 8°C (47°F).

Drainage (natural-soil)-Refers to moisture conditions that existed during the development of the soil, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven different classes of natural drainage are recognized.
Excessively drained soils are commonly very porous and very rapidly permeable and have a low water holding capacity.
Somewhat excessively drained soils are rapidly permeable and are free from mottling throughout their profile.
Well-drained soils are typically free from mottling, moderately permeable, and commonly of medium texture.
Moderately well drained soils commonly have a slowly permeable layer in or immediately beneath the lower subsoil. They have uniform color in the surface soil and in the upper subsoil and have mottling in the lower subsoil and in the substratum.
Imperfectly or somewhat poorly drained soils are wet for significant periods but not all the time, and many soils commonly have mottlings below 6 to 16 inches in the lower surface soil and in the upper subsoil.
Poorly drained soils are wet for long periods and are light gray and generally mottled from the surface downward, although mottling may be absent or nearly so in some soils.

Very poorly drained soils are wet nearly all the time. They have a dark-gray or black surface layer and are gray or light gray with or without mottling, in the deeper parts of the profile.

Drip Line-is an imaginary boundary on the ground that is delineated by the outermost tips of the branches of tree.

Federally Listed Species:

Endangered An endangered species or subspecies is one whose prospects for survival and reproduction are in immediate jeopardy. Its peril may result from one or many causes-loss of habitat or change in habitat, overexploitation, predation, competition, disease. An endangered species must have help or extinction will probably follow.

Rare A rare species or subspecies is one that, although not presently threatened with extinction, is in such small numbers throughout its range that it may be endangered if its environment worsens. Close watch of its status is necessary.

Frigid-Mean annual soil temperature is less than 8°C (47°F), and the difference between mean winter and mean summer temperature is more than 5°C (41°F).

General Plan Guidelines-is a comprehensive guide to California's land use planning statutes, prepared by the Governor's Office of Planning and Research in accordance with Government Code Section 65040.2.

Greenway- (See Section IX - B, page 44. Also, Land Use Element)

Goal-"...is a direction-setter. It is an ideal future end, condition or state related to the public health, safety or general welfare toward which planning and planning implementation measures are directed. A goal is a general expression of community values and, therefore, is abstract in nature. Consequently, a goal is generally not quantifiable, time-dependent or suggestive of specific actions for its achievement." (Governor's Office of Planning and Research 1990,16).

Hardpan-A hardened or cemented soil horizon, or layer. The soil material may be sandy or clayey, and it may cemented by iron oxide, silica, calcium carbonate, or other substance.

Hyperthermic-The mean annual soil temperature is 22^{C} (72°F) or higher, and the difference between mean summer and mean winter soil temperature is more than 5°c (41°F).

Implementation Measures-"...is an action, procedure, program or technique that carries out general plan policy. Each policy must have at least one corresponding implementation measure." (Governor's Office of Planning and Research 1990,16).

Mesic-Mean annual soil temperature is 8°C (47°F) or higher, but lower than 15°C (59°F), and the difference between mean summer and mean winter soil temperature is more than 5°C (41°F).

mmhos/cm-a unit of electrical conductivity, which is a measure of the salinity of soil.

Northern Sacramento Valley Air Basin-consists of the counties of Butte, Colusa, Glenn, Shasta, Sutter, Tehama and Yuba.

Objective-"...is a specific end, condition or state that is an intermediate step toward attaining a goal. It should be achievable and, when possible, measurable and time-specific. An objective may only pertain to one particular aspect of a goal or it may be one of several successive steps toward goal achievement. Consequently, there may be more than one objective for each goal." (Governor's Office of Planning and Research 1990,17).

Parent Material-The horizon of weathered rock or partly weathered soil material from which soil has formed.

Pergelic-The mean annual soil temperature is lower than 0°C (32°F).

Permeablility-The quality of a soil horizon that enables it to transmit water or air. Terms used to describe permeability are very slow, slow, moderately slow, moderate, moderately rapid, rapid, and very rapid.

pH-a 14 point system used for measuring levels of acid and alkali in most substances, such as soils. Acids are at the lower end of the scale.

Planning, Zoning and Development Laws (PZDL)-The Governor's Office of Planning and Research prepares the PZDL on an annual basis. The content includes current planning and zoning laws and an array of miscellaneous planning related laws.

Pleistocene-refers to a geologic, glacial epoch occurring in the Quaternary period in the Cenozoic era.

Pliocene-refers to a geologic epoch occurring just after the Pleistocene epoch in the Tertiary period (also in the Cenozoic era).

Policy-"...is a specific statement that guides decision making. It indicates a clear commitment of the local legislative body. A policy is based one general plan's goals and objectives as well as the analysis of data. A policy is effectuated by implementation measures.

Riparian Habitat- "Riparian System" as defined in Section II-C on page 5 or as delineated on maps adopted by the city.

Runoff-The rate at which water flows over the surface of the soil. Relative terms are very rapid, rapid, medium, slow, very slow and ponded.

Root Protection Zone (RPZ)-is that zone which extends 1.5 times the size of the area between the tree trunk and the drip line of tree.

Sand-Individual fragments of rocks or minerals that have diameters ranging from 0.05 (0.002 inch) to 2.0 (0.079 inch) millimeters. Most sand grains consist of quartz, but they may be of any mineral composition. The term sand

also is applied to a soil that contains 85 percent or more sand and not more than 10 percent clay.

Silt-Mineral particles in a soil that range in diameter from 0.002 (0.000079 inch) to 0.05 (0.002 inch) millimeter. The silt is also applied to a soil that contains 80 percent or more silt and less than 12 percent clay.

Soil Moisture regimes-are used in defining soil classes at various levels in the soil taxonomy system.

Soil Profile-The sequence of natural layer, or horizons, in a soil; it extends from the surface down into the parent material.

Soil Structure-The arrangement of the primary soil particles into lumps, granules, or other aggregates. Structure is described by grade-weak, moderate, or strong; that is, the distinctness and durability of the aggregates. It is also described by the size of the aggregates-very fine, fine, medium, coarse, or very coarse; and by their shape-platy, prismatic, columnar, blocky, granular, or crumb. A soil is described as structureless if there are no observable aggregates. Structureless soils may be massive (coherent) or single grain (noncoherent).
Blocky, anguluarAggregates are shaped like blocks; they may have flat or rounded surfaces that join at sharp angles.
Blocky, subangular-Aggregates have some rounded and some flat surfaces; the upper sides are rounded.
Columnar-Aggregates are prismatic and are rounded at the top.
Crumb-Aggregates are generally soft, small, porous, and irregular, but tend toward a spherical shape.
Granular-Aggregates are roughly spherical and small. They may be either hard or soft but are generally more firm and less porous than crumb and are without the distinct faces of blocky structures.
Platy-Aggregates are flaky or platelike.
Prismatic-Aggregates have flat, vertical surfaces, and their height is greater than their width or depth.

Soil temperature regime-are used in defining soil classes at various levels in the soil taxonomy system.

Solum-The upper part of the soil profile, above the parent material, in which the processes of soil formation are active. The solum of mature soil includes the A and B horizons.

Substratum-Any layer below the solum, either conforming (C or R) or unconformity.

Surface Soil-The upper part of the soil that is ordinarily moved in tillage, or its equivalent in uncultivated soil, about 5 to 8 inches.

Texture-The relative amounts of the various size classes of soil particles, such as sand, silt and clay.

Thermic-the mean annual soil temperature is 15°C (59°F) or higher, but lower than 22°C (72°F), and the difference between mean summer and mean winter soil temperature is more than 5°C (41°F).

Ustic soil moisture regime-involves the concept of limited, but effective, soil moisture. Though implying dryness, moisture is available at a time when conditions are suitable for plant growth.

Water Table-The highest part of he soil or underlying rock material that is wholly saturated with water. In some places an upper, or perched, water table may be separated from a lower one by a dry zone.

Wetland- (See Section II-D)

Xeric soil moisture regime-typically found in Mediterranean climates where winters are moist and cool, and summers are warm and dry.

NATURAL ENVIRONMENT ELEMENT

XII. AGENCY REFERENCE LIST

California Air Resources Board
Public Information Office
P.O. Box 2815
Sacramento, California 95812
(916) 322-2990
*this is the agency responsible for the quarterly and annual air quality reports, referred to as "Blue Books".

For technical questions, you can call Dennis Goodenow at(916) 445-4292.

California Department of Conservation
Office of Land Conservation
Farmland Mapping and Monitoring Program
801 K Street, 13-71
Sacramento, California 95814
(916) 324-0859

California Department of Fish and Game
P.O. Box 606
Red Bluff, California 96080
(916) 527-2713
contact: Dave Walker (Wildlife Biologist-Red Bluff)
AND
Department of Fish and Game
P.O. Box 944290
Sacramento, California 94244-2090
(916) 322-2493
contact: Nancy Vierra (Natural Diversity Data Base)

California Department of Forestry
Integrated Hardwood Range Management Program
(916) 739-3361
contact: Cathy Blier or Greg Greenwood

Department of Water Resources
Northern District
2440 Main Street
Red Bluff, California 96080
(916)527-6530
contact: Mr. Buer (Chief Geologist)
OR
contact: Mr. Ralph N. Hinton (Chief, Environmental Branch)

Governor's Office of Planning and Research
1400 10th Street, Suite 250
Sacramento, California 95814
(916) 445-4831
contact: Robert Cervantes (Chief, Planning Unit)

Greenbelt Alliance, People for Open Space
116 New Montgomery, Suite 640
San Francisco, California 94105
(415) 543-4291
contact: Jim Sayer (Communications Director)

Office of Mines and Geology
801 K Street, Mall Stop 14-34
Sacramento, California 95814-3532
(916) 327-1850
contact: Silvia Bender-Lamb (librarian)
(916) 445-5716
contact: Dale Stickney (general information)

Pacific Gas and Electric Company, North Valley Division
P.O. Box 340
Red Bluff, California 96080
(916) 824-5367
(916) 529-6260
contact: Thomas A. Wess (Area Manager)

Tehama County Air Pollution Control District
P.O. Box 38
Red Bluff, California 96080
(916) 527-3717
contact: Vic Williams (Air Pollution Control Officer)
Gary Bovee (Asst. Air Pollution Control Officer)

Tehama County Planning Department
Room 1, Courthouse Annex
Red Bluff, California 96080
(916) 527-2200
contact: John Brewer (Planner II)

United States Department of Agriculture
Soil Conservation Service
2 Sutter Street, Suite D
Red Bluff, California 96080
(916) 527-4231
contact: Mark Parson

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APPENDIX A

Summary of Statutory Responsibilities and Requirements

Section 65300 of the California 1992 Planning, Zoning, and Development Laws states that,

> "...Each planning agency shall prepare and the legislative body of each county and city shall adopt a comprehensive, long-term general plan for the physical development of the county or city, and of any land outside its boundaries which in the planning agency's judgment bears relation to its planning." (Governor's Office of Planning and Research 1992, 26-27).

State Law also requires that seven mandatory elements be included in this plan. These elements are; Land Use, Circulation, Housing, Conservation, Open Space, Noise and Safety. There are specific requirements and guidelines for each element. These requirements are addressed below for the Conservation and Open Space elements.

Conservation

The statutory responsibilities of the Conservation Element, as indicated by Section 65302(d) of the California 1992 Planning, Zoning, and Development Laws is as follows;

> "...(d) A conservation element for the conservation, development, and utilization of natural resources including water and its hydraulic force, forests, soils, rivers and other waters, harbors, fisheries, wildlife, minerals and other natural resources. That portion of the conservation element including waters shall be developed in coordination with any countywide water agency and with all district and city agencies which have developed, served, controlled or conserved water for any purpose for the county or city for which the plan is prepared. The conservation element may also cover:
> (1) The reclamation of land and waters.
> (2) Prevention and control of the pollution of streams and other waters.
> (3) Regulation of the use of land in stream channels and other areas required for the accomplishment of the conservation plan.
> (4) Prevention, control, and correction of the erosion of soils, beaches, and shores.
> (5) Protection of watersheds.
> (6) The location, quantity and quality of the rock, sand and gravel resources.
> (7) Flood control.

Open Space

The statutory responsibilities of the Open Space Element are more detailed and lengthy than those of the Conservation Element. Under the above cited Section (65302) there are no direct responsibilities stated for the Open Space Element. These requirements are found in Article 10.5 which commences with Section 65560. Due to the complexity and length of these statutes, a brief, more concise selection of the law is presented here. In general, State Law defines that:

> "...(b) "Open-space land" is any parcel or area of land or water which is essentially unimproved and devoted to an open-space use as defined in this section, and which is designated on a local, regional, or state open-space plan as any of the following:
>
> (1) **Open space for the preservation of natural resources,** including, but not limited to, areas required for the preservation of plant and animal life, including habitat for fish and wildlife species; areas required for ecologic and other scientific study purposes; rivers, streams, bays and estuaries; and coastal beaches, lakeshores, banks of rivers and streams, and watershed lands.
> (2) **Open space used for the managed production of resources,** including, but not limited to forest lands, rangeland, agricultural lands and areas of economic importance for the production of food or fiber; areas required for recharge of ground water basins; bays, estuaries, marshes, rivers and streams which are important for the management of commercial fisheries; and areas containing major mineral deposits, including those in short supply.
> (3) **Open space for outdoor recreation,** including but not limited to, areas of outstanding scenic, historic and cultural value; areas particularly suited for park and recreation purposes, including access to lakeshores, beaches, and rivers and streams; and areas which serve as links between major recreation and open-space reservations, including utility easements, banks of rivers and streams, trails, and scenic highway corridors.
> (4) **Open space for public health and safety,** including, but not limited to, areas which require special management or regulation because of hazardous or special conditions such as earthquake fault zones, unstable soil areas, flood plains, watersheds, areas presenting high fire risks, areas required for the protection of water quality and water reservoir and area required for the protection enhancement of air quality." (Governor's Office of Planning and Research 1992, 37).

The Legislature also defines the policy and intent of open space lands. A clear understanding of these policies and intent is crucial to the appropriate administration and implementation of an open space plan. Section 65561 and 65562 of Article 10.5 of the California 1992 Planning, Zoning, and Development Laws address these issues:

Section 66561 The Legislature finds and declares as follows:

(a) That the preservation of open space land, as defined in this article, is necessary not only for the maintenance of the economy of the state, but also for the assurance of the continued availability of land for the production of food and fiber, for the enjoyment of scenic beauty, for recreation and for the use of natural resources.

(b) That discouraging premature and unnecessary conversion of open space land to urban uses is a matter of public interest and will be of benefit to urban dwellers because it will discourage non-contiguous development patterns which unnecessarily increase the costs of community services to community residents.

(c) That the anticipated increase in the population of the state demands that cities, counties, and the state at the earliest possible date make definite plans for the preservation of valuable open space and take positive action to carry out such plans by the adoption and strict administration of laws, ordinances, rules and regulations as authorized by this chapter or by other appropriate methods.

(d) That in order to assure that the interests of all its people are met in the orderly growth and development of the state and the preservation and conservation of its resources; it is necessary to provide for the development by the state, regional agencies, counties and cities, including charter cities, of statewide coordinated plans for the conservation and preservation of open space land.

(e) That for these reasons this article is necessary for the promotion of the general welfare and for the protection of the public interest in open space land.

Section 66562 It is the intent of the Legislature in enacting this article:

(a) To assure that cities and counties recognize that open space land is a limited and valuable resource which must be conserved wherever possible.

(b) To assure that every city and county will prepare and carry out open space plans which, along with state and regional open space plans, will accomplish the objectives of a comprehensive open space program.

It is also required that every local open space plan, "...shall contain an action program consisting of specific programs which the legislative body intends to pursue in implementing its open-space plan." (Governor's Office of Planning and Research 1992, 34)

There are several clauses that require internal consistency between the actions of the city or county and the open space element. These requirements are found in Section 65566 and 65567. They are as follows:

Section 65566 Any action by a county or city by which open space land or any interest therein is acquired or disposed of or its use restricted or regulated, whether or not pursuant to this part, must be consistent with the local open space plan.

Section 65567 No building permit may be issued, no subdivision map approved, and no open space zoning ordinance adopted, unless the proposed construction, subdivision or ordinance is consistent with the local open space plan.

In addition to the responsibilities dictated by Article 10.5 for the preparation of an Open Space Element, Article 4 of the California 1992 Planning, Zoning, and Development Laws requires that:

> "Every city and county...shall prepare and adopt an open-space zoning ordinance consistent with the local open-space plan adopted pursuant to Article 10.5..." (Governor's Office of Planning and Research 1992, 74).

APPENDIX B

Related Case Laws and
Other Planning Laws
Adapted directly from the
1990 General Plan Guidelines

CASE LAW

Save El Toro Assn. v. Days (1977) 74 Cal.App.3d 64, reinforces the open-space plan requirement. The California Court of Appeal held that because the city of Morgan Hill had not adopted an open-space plan, the city could not acquire, regulate or restrict open space land or approve a subdivision map. Mere adoption, however, does not protect a local jurisdiction from the adverse consequences of a law suit challenging an open-space element. An open-space element must also meet the specifications of the Government Code, including an inventory of open space resources.

Sierra Club v. Kern County (1981) 126 Cal.App.3d 698, voided a precedence clause that gave a land use element priority over an open-space element on the grounds that it violated Government Code Section 65300.5 (requiring that elements of a general plan comprise an integrated, internally consistent and compatible statement of policy).

No Oil, Inc. v. City of Los Angeles (1988) 196 Cal.App.3d 223, offers an interpretation of the meaning of the term "open space for the managed production of resources." A citizens' group challenged the city's approval of oil drilling zones in a coastal area designated as open space by the Brentwood-Pacific Palisades district plan. Absent specific contradictory language in the district plan, the court held that because oil recovery is the managed production of a natural resource it was therefore consistent with the plan's open space areas. In light of this decision, it is strongly recommended that local general plans specify the types of land use which are intended to comprise open space.

Kings County Farm Bureau v. City of Hanford (1990) 221 Cal.App.3d 692 (as modified by 222 Cal.App.3d 516a) the California Court of Appeal affirmed that a general plan may consist of several documents. Nevertheless, the information in associated documents, when not referenced by the general plan, may not compensate for deficiencies in the conservation element.

PLANNING LAW

Bicycle Paths (Streets and Highways Code Section 1712)

California Bikeways Act (Streets and Highways Code Sections 2370-2394)

California Endangered Species Act (Fish and Game Code Sections 2050 et seq.)

California Environmental Quality Act (CEQA) (Public Resources Code Sections 21000 et seq.)

California Environmental Quality Act (CEQA) Guidelines (California Administrative Code Title 14, Sections 15000 et seq.)

California Land Conservation Act of 1965 (Government Code 51200 et seq.)

California Recreational Trails Act (Public Resources Code Sections 5070 et seq.)

California Urban Forestry Act of 1978 (Public Resources Code Section 4799.06-4799.12)

Conservation Easements (Civil Code Sections 815-816)

Flood Plain Regulations (Water Code Sections 8400-8415)

Hazardous Waste Planning (Tanner) (Government Code Sections 65963.1, 66780.8; Health and Safety Code Sections 25135, 25199)

Open-Space Easements (Government Code Sections 51050 et seq.)

Open-Space Easement Act of 1974 (Government Code Sections 51070 et seq.)

Open-Space Land Enforceably Restricted, Property Tax Assessment (Revenue and Taxation Code Sections 421 et seq.)

Open Space Maintenance District (Government Code Sections 50575 et seq.)

Open Space and Areas, preservation by City or County Acquisition of Interests or Rights (Government Code Sections 6950 et seq.)

Regional Park, Park and Open-Space, and Open-Space Districts (Public Resources Code 5500 et seq.)

Wild and Scenic Rivers Act (Public Resources Code Sections 5093.50 et seq.)

APPENDIX C

Potential Species of Birds

Great blue heron
Great egret
Snowy egret
Green-backed heron
Black-crowned night heron
Wood duck
Mallard
American wigeon
American wigeon
Hooded merganser
Common merganser
Turkey vulture
Osprey
Black-shouldered kite
Bald eagle
Northern harrier
Sharp-shinned hawk
Cooper's hawk
Northern goshawk
Red-shouldered hawk
Swainson's hawk
Red-tailed hawk
Ferruginous hawk
Rough-legged hawk
Golden eagle
American kestrel
Merlin
Peregrine falcon
Prairie falcon
Northern rough-winged swallow
Turkey
California quail
Mountain quail
Virginia rail
Band-tailed pigeon
Mourning dove
Yellow-billed cuckoo
Common barn-owl
Flammulated owl
Western screech-owl
Great horned owl
Northern pygmy-owl
Long-eared owl
Short-eared owl
Brown creeper
Canyon wren
Bewick's wren
House wren
Winter wren

Northern saw-whet owl
Common nighthawk
Common poorwill
Black swift
White-throated swift
Black-chinned hummingbird
Anna's hummingbird
Calliope hummingbird
Belted Kingfisher
Lewis' woodpecker
Acorn woodpecker
Yellow-breasted sapsucker
Red-breasted sapsucker
Nuttall's woodpecker
Downy woodpecker
Hairy woodpecker
Northern flicker
Western wood-pewee
Willow flycatcher
Hammond's flycatcher
Dusky flycatcher
Western flycatcher
Balck phoebe
Ash-throated flycatcher
Western kingbird
Purple martin
Tree swallow
Violet-green swallow
Ringed-necked pheasant
Bank swallow
Cliff swallow
Barn swallow
Steller's jay
Scrub jay
Black-billed magpie
Yellow-billed magpie
American crow
Common raven
Moutain chickadee
Chestnut-backed chickadee
Plain titmouse
Bushtit
Red-breasted nuthatch
White-breasted nuthatch
Lark sparrow
Savannah sparrow
Fox sparrow
Song sparrow
Lincoln's sparrow

Marsh wren
Ruby-crowned kinglet
Golden-crowned kinglet
Blue-gray gnatcatcher
Western bluebird
Swainson's thrush
Hermit thrush
American robin
Varied thrush
Wrentit
Northern mockingbird
California thrasher
Cedar waxwing
Phainopepla
Loggerhead shrike
Solitary vireo
Warbling vireo
Nashville warbler
Yellow-rumped warbler
Black-throated gray warbler
MacGillivray's warbler
Wilson's warbler
Western tanager
Blue grosbeak
Rufous-sided towhee
Chipping sparrow
Golden-crowned sparrow
White-crowned sparrow
Dark-eyed junco
Brewer's blackbird
Red-winged blackbird
Brown-headed cowbird
Northern oriole
Purple finch
House finch
Pine siskin
Lesser goldfinch
American goldfinch
Evening grosbeak
Northern shrike
European starling
Hutton's vireo
Orange-crowned warbler
Yellow warbler
Townsend's warbler
Hermit warbler
Common yellowthroat
Yellow--breasted chat
Black-headed grosbeak
Lazuli bunting
Brown towhee

source: Lake Red Bluff Recreation Development, Final EIS (USDA) 1990 (Proposed Sacramento River National Wildlife Refuge Environmental Assessment) (March 16, 1989-USFWS))

APPENDIX D

Potential Species of Fish

Sacramento River

Chinook salmon
King salmon
steelhead trout
rainbow trout
striped bass
largemouth bass
smallmouth bass
American shad
Threadfin shad
green sturgeon
white sturgeon

Tributaries

Pacific lamprey
green sturgeon
white sturgeon
American shad
Treadfin shad
Chinook salmon
steelhead trout
rainbow trout
carp
Sacramento squawfish
roach
hitch
Sacramento blackfish
hardhead
golden shiner
Threespine sticlebac
striped bass
green sunfish
redear
bluegill
laregmouth bass
smallmouth bass
Tule perch
sculpins
King salmon
stickleback
white catfish
channel catfish
bullheads
mosquitofish
Sacramento sucker

sources: Draft Environmental Assessment, Red Bluff Diversion Dam Pilot Pumping Plant Program, United States Bureau of Reclamation, October, 1992 and Distribution of Fish in Selected Backwaters of the Sacramento River (TABLE 3) California Department of Fish and Game (unpublished) 1980.

APPENDIX E

Potential Species of Mammals

Virginia opossum
Vagrant shrew
Ornate shrew
Broad-footed mole
Little brown myotis
Yuma myotis
Long-eared myotis
Finged myotis
Long-legged myotis
California myotis
Small-footed myotis
Silver-haired bat
Western pipistrelle
Big brown bat
Red bat
Hoary bat
Spotted bat
Townsend's big-eared bat
Pallid bat
Brazilian free-tailed bat
Western mastiff bat
Brush rabbit
Black-tailed jack rabbit
California ground squirrel
Golden-mantled ground squirrel
Western gray squirrel
Great basin pocket mouse
Western harvest mouse
Brush mouse
Dusky-footed woodrat
California vole
Muskrat
Black rat
Norway rat
House mouse
Western jumping mouse
Porcupine
Coyote
Gray fox
Black bear
Ringtail
Raccoon
Badger
Long-tailed weasel
Western spotted skunk
Striped skunk
River otter
Mountain lion
Wild pig
Elk
Mule deer
Feral goat
Desert cottontail
Allen's chipmunk
Sonoma chipmunk
Gray squirrel
Northern flying squirrel
Northern pocket gopher
Beaver
Deer mouse
Pinyon mouse
Bushy-tailed woodrat
Creeping vole

source: Lake Red Bluff Recreational Development, Final EIS 1991, USDA Forest Service (Proposed Sacramento River Natioanl Wildlife Refuge Environmental Assessment, March 16, 1989) (USFWS)).

APPENDIX F

Potential Species of Reptiles

Western pond turtle
Coast horned lizard
Gilbert's skink
Southern alligator lizard
Sharp-tailed snake
Coachwhip
Gopher snake
California mountain kingsnake
Western terrestrial garter snake
Western aquatic garter snake
Western fence lizard
Western skink
Western whiptail
Ringneck snake
Racer
Striped racer
Common kingsnake
Common garter snake
Night snake
Western rattlesnake

source: Lake Red Bluff Recreation Development, Final EIS (USDA) 1990.

APPENDIX G

Potential Species of Amphibians

Tiger salamander
Pacific giant salamander
California newt
Ensatina
California slender salamander
Paccific treefrog
Foothill yellow-legged frog
Northwestern salamander
Rough-skinned newt
Red-bellied newt
Black salamander
Western toad
Bullfrog

source: Lake Red Bluff Recreation Development, Final EIS (USDA) 1990.

APPENDIX H

Water Quality Data

PARAMETER	UNITS	MAXIMUM CONTAINMENT LEVEL	RANGE OF TEST WATER VALUES
CLARITY			
Turbidity	NTU	0.5	N/A
MICROBIOLGOICAL			
Coliform Bacteria	Portions Positive	10% per month	Standards Met Monthly
ORGANIC CHEMCIALS			
Total Trihalomethanes	mg/L	0.10	No detectable
Endrin	mg/L	0.0002	" "
Lindane	mg/L	0.004	" "
Benzene	mg/L	0.001	" "
Carbon Tetrachloride	mg/L	0.0005	" "
1,4-Dichlorobenzene	mg/L	0.005	" "
1,2-Dichloroethane	mg/L	0.0005	" "
1,1-Dichlorethylene	mg/L	0.006	" "
1,3-Dichloropropene	mg/L	0.0005	" "
Ethylbenzene	mg/L	0.680	" "
Monochlorobenzene	mg/L	0.030	" "
1,1,2,2-Tetrachlorethane	mg/L	0.001	" "
Tetrachloroethylene	mg/L	0.005	" "
1,1,2-Trichloreoethane	mg/L	0.200	" "
Trichloroethylene	mg/L	0.032	" "
Vinyl Chloride	mg/L	0.005	" "
Xylenes	mg/L	0.0005	" "
Cis-1,2-Dichloroethylene	mg/L	0.750	" "
Trans-1,2-Dichloroethylene	mg/L	0.006	" "
1,1-Dichloroethane	mg/L	0.005	" "
1,2-Dichloropropane	mg/L	0.005	" "
Trichlorofluoromethane (Freon 11)	mg/L	0.15	" "
1,1,2-Trichloro-1,2,2-Trifluoroethan (Freon 113)	mg/L	1.2	" "
INORGANIC CHEMICALS			
Aluminum	mg/L	1.0	next testing
Arsenic	mg/L	0.05	<.0005 mg/L
Barium	mg/L	1.0	<.01 mg/L
Cadmium	mg/L	0.010	<.0001 mg/L
Chromium	mg/L	0.05	<.001 mg/L
Flujoride	mg/L	1.4-2.4*	.1-.28 mg/L
Lead	mg/L	0.05	<.0001 mg/L
Mercury	mg/L	0.002	<.001 mg/L
Nitrate (as NO3)	mg/L	45.0	<1-10 mg/L
Selenium	mg/L	0.01	<.0005 mg/L
Silver	mg/L	0.05	<.001 mg/L
RADIOACTIVITY			
Gross Alpha Activity	pCi/L	15	0-2

PARAMETER	UNITS	MAXIMUM CONTAINMENT LEVEL	RANGE OF TEST WATER VALUES
OTHER			
Color	Units	15.0	<3
Odor Threshold	Units	3.0	<1
Chloride	mg/L	500	5-20 mg/L
Copper	mg/L	1.0	<.005 mg/L
Foaming Agents (MBAS)	mg/L	0.5	
Iron	mg/L	0.3	<.01 mg/L
Manganese	mg/L	0.05	<.003 mg/L
Sulfate	mg/L	500.0	<1-10 mg/L
Zinc	mg/L	5.0	<.005 mg/L
Total Dissolved Solids	mg/L	1,000.0	127-210 mg/L
ADDITIONAL CONSTITUENTS ANALYZED			
pH	Std. Units	No Standard	7.3-7.8
Hardness	mg/L	" "	60-113 mg/L
Sodium	mg/L	" "	12-23 mg/L
Calcium	mg/L	" "	14-24 mg/L
Potassium	mg/L	" "	.5-2.5 mg/L
Magnesium	mg/L	" "	6-13 mg/L

Mg/L = Milligram per liter (parts per million)
pCi/L = Pico Curies per liter

* Fluoride Standard depends on temperature

source: City of Red Bluff Annual Water Report, 1991, City of Red Bluff Public Works Department.

APPENDIX I

Hazardous Household Wastes

Pesticides
Garden
Indoor insects (eg. flea spray)
Outdoor insects
Fertilizer/pesticide mixtures
Fungicides (eg. wood preservatives)

Polish
Automobile
Furniture
Floor
Shoe
Leather
Metal

Adhesives and Sealants
Caulk
Solvent-based adhesives

Batteries
Household (alkaline)
Rechargeable
Automotive
Other

Household Cleaners
Floor
Furniture
General purpose
Rug
Upholstery
Window
Bleach
Spot Remover

Automotive Products
Motor oil
Transmission fluid
Hydraulic fluid
Carburetor cleaner
Radiator cleaner
Antifreeze
Engine cleaner
Lubricant
Used oil filters
Waste oil

Paint and Coatings
Solvent and thinner
Oil based paint
Water based paint
Varnish and stain
Spray paint
Auto paint

source: Tehama County Hazardous Waste Management Plan, Volume I
Brown, Vence & Associates and Sarrah Dunlap & Associates, 1989.

APPENDIX J

Hazardous Household Waste Disposal

Tehama County does not currently have a household hazardous waste disposal program or storage/disposal site. The most feasible disposal location for Red Bluff residents is the Benton Transfer Station in Redding. A recycling center is also located on site.

BENTON TRANSFER STATION
2001 Buena Ventura Boulevard
Redding, California 96001
(916) 225-4109

Recyclables	Hazardous Waste
Cardboard	Waste Oil (25¢/gal)
Glass	Latex Paint (no charge-by appt. only 225-4520)
Milk Jugs	Anti-freeze ($1.00/gal)
Newspaper	Lead-Acid Batteries (free)
Metal (anything in a condition to be reused)	Used Oil Filters, fully drained (25¢/filter)

Business Hours

Tuesday through Saturday; 8am to 5pm

Location

South of Placer Street, North of Starlight Blvd. on Buena Ventura Blvd.

APPENDIX K

Soil Types

MAP SYMBOL	SOIL	ACRES	PERCENT SLOPES
AvA	Arbuckle gravelly loam	17,454	0 to 3
Aw	Arbuckle gravelly loam, clayey substratum	676	0 to 3
Ay	Arbuckle gravelly loam, clayey substratum, channeled	12,926	
Au	Arbuckle gravelly fine sandy loam	4,174	0 to 3
Cc	Clear Lake clay	1,280	
CmA	Columbia fine sandy loam	2,073	0 to 3
CmB	Columbia fine sandy loam	1,315	3 to 8
CsA	Columbia silt loam	6,334	0 to 3
CsB	Columbia silt loam	1,270	3 to 8
Cu	Columbia complex, channeled	8,367	
CxB2	Corning-Newville gravelly loams, eroded	36,712	3 to 10
CyB	Corning-Redding gravelly loams	22,783	0 to 5
Cz	Cortina gravelly fine sandy loam	1,858	
Czs	Cortina very gravelly fine sandy loam	1,443	
HgA	Hillgate loam	11,462	0 to 3
Hl	Hillgate silt loam	4,046	0 to 3
Mc	Maywood fine sandy loam	706	0 to 3
Md	Maywood fine sandy loam, moderately deep	562	0 to 3
Mh	Maywood silt loam	628	0 to 3
Mf	Maywood loam, high terrace	4,948	0 to 3
NhB	Nacimiento-Newville complex	3,595	3 to 10
NrD	Newville gravelly loam	36,798	10 to 30

MAP SYMBOL	SOIL	ACRES	PERCENT SLOPES
NrB	Newville gravelly loam	1,683	3 to 10
NrD2	Newville gravelly loam, eroded	15,195	10 to 30
NrE	Newville gravelly loam	91,281	30 to 50
PkA	Perkins gravelly loam	7,329	0 to 3
PkB	Perkins gravelly loam	1,433	3 to 8
Rg	Red Bluff gravelly loam	9,493	0 to 3
Rh	Red Bluff gravelly loam, hardpan substratum	2,115	0 to 3
Rb	Red Bluff loam	461	0 to 3
RnA	Redding gravelly loam	7,788	0 to 3
RnB	Redding gravelly loam	486	3 to 8
Rr	Riverwash	17,592	
TaA	Tehama loam	9,239	0 to 3
TaB	Tehama loam	8,492	3 to 8
Tb	Tehama gravelly loam	919	0 to 3
Za	Zamora loam	1,960	0 to 3

source: Soil Survey, Tehama County, USDA Soil Conservation Service

APPENDIX L

Description of Soil Types
Adapted directly from the
Soil Survey, Tehama County California

The following information has been taken directly from the Soil Survey, Tehama County California, and applies specifically to the soils found within the Red Bluff Planning Area. The soils are presented in alphabetical order, according to soil series. General information is provided for each series, followed by a more detailed description of individual soil types.

ARBUCKLE SERIES

General Information

Soils of the Arbuckle series are nearly level to gently sloping, well drained, and gravelly. They formed in gravelly alluvium derived from sedimentary and metamorphic rocks. The alluvium contains many, light-colored pebbles of quartz and chert.

These soils have a surface soil of brown, slightly acid gravelly loam or fine sandy loam. The subsoil is brown, neutral gravelly clay loam or loam. It generally grades to a substratum of very gravelly sandy loam, but in places the substratum is dense and slowly permeable.

Arbuckle soils are along most of the streams west of the Sacramento River at elevations between 200 and 1,000 feet. Grass and oak make up the vegetation.

Arbuckle gravelly loam, 0 to 3 percent slopes (AvA)-This soil is along streams west of the Sacramento River. Some of the areas are more than 500 acres in size, and many areas are long and narrow. Drainage is good, runoff is slow, and permeability is moderate to moderately rapid. The available water holding capacity is moderate, and fertility is also moderate. There is no erosion hazard. The gravel in the soil interferes with preparation of the seedbed and causes the implements used in cultivating the soil to wear excessively. This soil does not hold as much water as soils that are not gravelly, and it therefore requires more frequent irrigation. Test show that plants growing in a greenhouse in material from the surface layer of this soil respond if nitrogen and phosphate are applied. Included with this soil in mapping are small areas of Cortina, Hillgate, Maywood, and Tehama Soils.

Arbuckle gravelly loam, clayey substratum, 0 to 3 percent slopes (Aw)- This soil is underlain by very slowly permeable clay or partly consolidated siltstone at depths of 3 to 6 feet. The water table is high during years of high rainfall and when excess irrigation water accumulates. Runoff and permeability are slow. The available water holding capacity and fertility are moderate. Included with this soil mapping are small areas of Hillgate, Maywood, and tehama soils. Also included are some Arbuckle soils in the Paskenta area that are underlain by hard shale.

Arbuckle gravelly loam, clayey substratum, channeled (Ay)-This soil is along narrow drainageways in low foothills in the western part of the county. It

is channeled by meandering, intermittent streams but otherwise similar to Arbuckle gravelly loam, clayey substratum, 0 to 3 percent slopes. The streams have cut the soil into areas as small as 20 acres. The areas adjoin the sloping to steep foothills through which the streams flow. Their size and location are such that they cannot be managed separately from the adjoining soils on the foothills. Included with this soil in mapping are small areas of Cortina, Maywood, and Tehama soils.

Arbuckle gravelly fine sandy loam, 0 to 3 percent slopes (Au)-This soil has a gravelly fine sandy loam surface soil but otherwise is similar to Arbuckle gravelly loam, 0 to 3 percent slopes. It holds less water than the Arbuckle gravelly loam and therefore requires more frequent irrigation. Irrigation runs should be short because the water moves through the soils moderately rapidly.

CLEAR LAKE SERIES

General Information

The Clear Lake series consists of nearly level, dark-colored, poorly drained soils. These soils formed in alluvium derived from areas of sedimentary rocks. These soils are very dark gray, neutral clay to a depth of 2 to 3 feet. The subsoil is light-gray or light yellowish-gray, calcareous clay loam or clay. Clear Lake soils are in basins west of the Sacramento River. All of the acreage in Tehama County has been cultivated.

In color the A horizon ranges from black to very dark grayish brown, and the C horizon, which is generally mottled, from light gray to light yellowish brown. In some places pebbles occur in the A horizon. This horizon is slightly acid or neutral. The C horizon ranges from clay loam to clay in texture, and in some places it is gravelly. This horizon is generally calcareous. In many places during the winter, the water table is 3 to 5 feet below the surface, but when the soils are irrigated during the summer, it is less than 5 feet below the surface in places. Cracks 1 to 3 inches wide occur in the soils in summer. Tongues of material from the A and C horizons extend downward in most areas.

Clear Lake clay (Cc)-This is the only Clear Lake soil mapped in the county. It is smooth and nearly level and is in small basins on low terraces west of the Sacramento River. Drainage is poor, and runoff and permeability are very slow. The available water holding capacity is moderate, and fertility is also moderate. There is no erosion hazard. The soil stays wet during most of the winter, which also makes it difficult to manage. Plants growing in the greenhouse on this soil respond to fertilizer that contains nitrogen and phosphate. Included with this soil in mapping are small areas of Hillgate and Tehama soils.

Columbia Series

General Information

The Columbia series consists of nearly level to gently sloping, brown, well-drained, neutral soils that are medium textured to moderately coarse

textured. These soils formed in alluvium from sedimentary, metamorphic, and igneous rocks. They are on recent flood plains along the Sacramento River an Cottonwood Creek. The vegetation is hardwoods, shrubs, and grass.

Row crops, field crops, and orchard crops grow well in most areas of these soils. In areas near the Sacramento River the soils are cut by partly abandoned stream channels, and in places near the river they are subject to overflow during winters of high rainfall. Flooding has been considerably reduced, however, since Shasta Dam was built.

These soils range in color from brown and pale brown to grayish brown throughout. Where organic matter has accumulated on the surface, an A horizon has formed, and the surface soil is a little darker than the horizons below. Texture of the surface soil ranges from silt loam to loamy sand, and in places near the river the subsoil is gravelly. These soils are slightly acid to neutral in the surface soil and neutral to mildly alkaline in the subsoil. The lower part of the subsoil is very slightly calcareous in places.

Columbia fine sandy loam, 0 to 3 percent slopes (CmA)-This soil is on flood plains along the Sacramento River and Cottonwood Creek, and some areas are 100 acres or more in size. Most areas are nearly level and smooth and have been cut by abandoned stream channels in a few places. Drainage is good, runoff is very slow, and permeability is moderately rapid. The available water holding capacity and fertility are moderate. Plants growing in the greenhouse on this soil respond to fertilizer that contains nitrogen and phosphate. Streaming erosion is a hazard to areas that adjoin the main stream channel. Included with this soil in mapping are small areas that have a gravelly subsoil and some areas of Zamora soils.

Columbia fine sandy loam, 3 to 8 percent slopes (CmB)-This soil is in areas that are cut by several channels of abandoned streams. The surface is mostly smooth but partly rounded in places cut by stream channels. Runoff is slow, and the erosion hazard is slight.

Columbia silt loam, 0 to 3 percent slopes (CsA)-This soil is in large areas along the Sacramento River and Cottonwood Creek. The areas are far enough above the streams so that the soil is seldom affected by flooding. Most areas are smooth, though some areas are cut by channels of abandoned streams. This soil is well drained, runoff is very slow, and permeability is moderate. The available water holding capacity and fertility are high. There is no erosion. During irrigation the surface of the soil tends to seal over, and in some places it is difficult for water to move into the soil. Otherwise, this is one of the most productive soils in the county. If organic matter is mixed with the soil, it helps to control sealing. Included with this soil in mapping are small areas of Columbia soils that have a surface layer of loam or a subsoil that is gravelly. Also included are a few small areas of Zamora soils.

Columbia silt loam, 3 to 8 percent slopes (CsB)-This soil is cut by channels of abandoned streams but is otherwise similar to Columbia silt loam, 0 to 3 percent slopes.

Columbia complex, channeled (Cu)-This complex is near the main channels of the Sacramento River and Cottonwood Creek. It consists of various amounts of **Columbia fine sandy loam, 0 to 3 percent slopes** (CITED ABOVE);

Columbia fine sandy loam, moderately deep, 0 to 3 percent slopes (SEE BELOW), Columbia fine sandy loam, 3 to 8 percent slopes (CITED ABOVE); Columbia loam, 0 to 3 percent slopes (SEE BELOW); Columbia silt loam, 0 to 3 percent slopes (CITED ABOVE); Columbia silt loam, moderately deep, 0 to 3 percent slopes (SEE BELOW); and Columbia silt loam, 3 to 8 percent slopes (CITED ABOVE). In places a gravelly or sandy layer occurs at various depths. All areas are cut by channels of abandoned streams or channels of active streams. Most areas are flooded for short periods during the winter.

Columbia fine sandy loam, moderately deep, 0 to 3 percent slopes (Cn)-This soil has a layer of gravel and sand at a depth of 30 to 40 inches. In some places the gravelly and sandy layer is several feet thick. The areas are near the Sacramento River and are generally subject to overflow during winter when rainfall is high. Most areas are fairly smooth, but a few areas are cut by channels of abandoned streams.

Columbia loam, 0 to 3 percent slopes (Co)-This soil is loam throughout the profile. The available water holding capacity is high. Water moves through the soil at a moderate rate.

Columbia silt loam, moderately deep, 0 to 3 percent slopes (Ct)-This soil is near the Sacramento River, and it is subject to overflow during winters of high rainfall. It has gravelly and sandy layers below a depth of 30 or 40 inches. Some areas are cut by abandoned stream channels. The gravelly and sandy layers of the subsoil reduce the water holding capacity.

CORNING SERIES

General Information

The Corning series are nearly level to gently sloping, well-drained, reddish, gravelly soils that formed in old alluvium. The alluvium was derived from sedimentary and metamorphic rocks of the Coast Range Mountains. The surface soil is yellowish-red gravelly loam, and the subsoil is red gravelly clay.

Corning soils are on high terraces west of the Sacramento River a t elevations from 200 to 1,500 feet. A hummocky, or hogwallow, microrelief is characteristic of most areas. The vegetation is annual forbs and grasses.

Most areas of these soils are used for pasture and range or for dry-farmed grain. Because of a claypan in the subsoil, low fertility, and lack of water for irrigation, little intensive farming is done. The soils are medium acid to strongly acid.

Corning-Newville gravelly loams, 3 to 10 percent slopes, eroded (CxB2)-This complex consists of Corning gravelly loam, 3 to 8 percent slopes, and Newville gravelly loam, 3 to 10 percent slopes, eroded. Either soil may occupy from 20 to 80 percent of any one area.

Corning gravelly loam, 3 to 8 percent slopes (CwB)-This soil has an uneven surface because of small drainage ways that cut through

most of the areas. Most of the short drainageways are cut by gullies. Sheet erosion is slight to moderate in most areas.

Newville gravelly loam, 3 to 10 percent slopes, eroded (NrB2)-This soil is less steep but is otherwise similar to Newville gravelly loam, 10 to 30 percent slopes. Runoff is slow to medium and the erosion hazard is slight to moderate.

Corning-Redding gravelly loams, 0 to 5 percent slopes (CyB)-This complex consists of Corning gravelly loam, 3 to 8 percent slopes, and Redding gravelly loam, 0 to 3 percent slopes. Either soil may occupy from 20 to 80 percent of any area.

Corning gravelly loam, 3 to 8 percent slopes (CwB)-(CITED ABOVE, under Corning-Newville gravelly loams)

Redding gravel loam, 0 to 3 percent slopes (RnA)-(SEE BELOW, under this heading)

CORNING SERIES

General Information

The Cortina series consists of nearly level, somewhat excessively drained to excessively drained soils. These soils formed in recent gravelly alluvium derived from sedimentary and metamorphic rocks. The rocks contain many pebbles of chert and quartzite. Cortina soils are brown to yellowish brown throughout. The surface layer is gravelly fine sandy loam, and the subsoil is extremely gravelly sand. These soils are brown or pale brown to yellowish brown in color. The soils range from medium acid in the surface layer to neutral in the subsoil and substratum.

Cortina soils are along most of the streams west of the Sacramento River at elevations of 200 to 500 feet. They are generally on flood plains near active streams, but some of them are in channels of abandoned streams and along ridges. The vegetation is mostly annual grasses and forbs, but includes some hardwoods and shrubs.

Cortina gravelly fine sandy loam (Cz)-Most of this soil is in long narrow strips along stream channels. The surface is generally smooth, but the areas are cut by channels of abandoned streams in places. Drainage is somewhat excessive, runoff is very slow, and permeability is rapid. The soil consists of about 15 to 75 percent of rounded gravel by volume. Included with this soil in mapping are small areas of Arbuckle, Maywood, Orland, and Yolo soils.

Cortina very gravelly fine sandy loam (Czs)-This soil is located for the most part in relatively small areas. It is 50 to 90 percent gravel by volume. Drainage is excessive, runoff is very slow, and permeability is very rapid. The fertility and available water holding capacity are low.

HILLGATE SERIES

General Information

The Hillgate series consists of nearly level, well-drained soils. These soils formed in old alluvium washed from soils developed in material from shale, sandstone, and soft siltstone. The surface soil is light yellowish brown, massive, medium acid and medium textured. It is underlain abruptly by a yellowish brown subsoil that is massive, slightly acid to neutral, and fine textured. These soils are on low terraces, west of the Sacramento River at elevation of less than 1,000 feet. In most areas, pasture crops and row crops are grown. In some areas the vegetation is mostly grass and forbs but includes scattered oaks.

Hillgate loam, 0 to 3 percent slopes (HgA)-This soil is in wide areas on low terraces west of the Sacramento River. The areas vary in size and shape from place to place but are fairly smooth. This soil is well drained. Runoff is slow, and permeability is slow to very slow. Available water holding capacity is low. Movement of water and roots through the soil is restricted by the dense subsoil. There is little or no erosion. Included with this soil in mapping are small areas of Tehama, Arbuckle, and Kimball soils.

Hillgate silt loam, 0 to 3 percent slopes (HI)-Except for the texture of the surface soil, this soil is similar to **Hillgate loam, 0 to 3 percent slopes** (CITED DIRECTLY ABOVE). In some places water flowing over the surface of the soil almost seals the surface but in others the water considerably reduces the rate at which the soil takes in water.

MAYWOOD SERIES

General Information

The Maywood series consists of nearly level, well-drained soils formed in recent alluvium. The alluvium was derived mainly from softly consolidated sedimentary rocks. Maywood soils are pale brown, medium textured and neutral or slightly acid throughout. They are on flood plains west of the Sacramento River at elevations that range from 200 to 500 feet. Nearly all of the acreage is cultivated.

These soils range from pale brown to light yellowish brown in color. In many places they contain stratified material that ranges from loam to silt loam or fine sandy loam in texture or is gravelly in the lower part. Maywood soils range from slightly acid to neutral.

Maywood fine sandy loam, 0 to 3 percent slopes (Mc)-This soil is mainly fine sandy loam throughout but is otherwise similar to **Maywood loam, 0 to 3 percent slopes**. Permeability is moderately rapid, and the available water holding capacity is moderate.

Maywood loam, 0 to 3 percent slopes (Me)-This soil is on recent flood plains along fairly short streams west of the Sacramento River. The surface is smooth. Most areas are long and narrow, are less

than 100 acres in size, and generally are parallel to active streams. In some areas there is a layer of gravel at a depth of 4 feet or more.

Maywood fine sandy loam, moderately deep, 0 to 3 percent slopes (Md)-This soil is mainly fine sandy loam to a depth of 20 to 48 inches. Below this depth it is gravelly sand. The gravelly subsoil holds less water and makes the soil somewhat droughty.

Maywood silt loam, 0 to 3 percent slopes (Mh)-This soil has a surface soil of silt loam but is otherwise similar to **Maywood loam, 0 to 3 percent slopes** (CITED ABOVE, under **Maywood fine sandy loam**). Most areas are silt loam to a depth of at least 5 feet, but in a few places gravel is at a depth below 4 feet. Water penetrates this soil more slowly than the Maywood loam. The surface tends to seal over if water splashes on it or flows across the surface.

Maywood loam, high terrace, 0 to 3 percent slopes (Mf)-This soil is along many of the shorter streams west of the Sacramento River. Many of the areas are less than 100 acres in size and are long and narrow. Drainage is good. Runoff is very slow, and permeability and fertility are moderate. Included with this soil in mapping are areas of Arbuckle, Hillgate, and Tehama soils.

NACIMIENTO SERIES

General Information

The Nacimiento series are gently sloping to steep, well-drained soils that formed in softly consolidated material chiefly from siltstone. The surface soil is light brownish gray, and the subsoil is light gray. These soils are calcareous silty clay loam throughout. They are on rounded foothills west of the Sacramento River at elevation of 300 to 1,500 feet. Most areas have been cultivated.

The color of the surface layer is generally light brownish gray, but in places it is grayish brown or pale brown. The subsoil is light gray, pale yellow, or nearly white. In areas that are not cultivated, the surface layer is 1 to 2 inches thick and is nearly a dark grayish brown.

Nacimiento-Newville complex, 3 to 10 percent slopes (NhB)-This complex consists of **Nacimiento silty clay loam, 3 to 10 percent slopes** (SEE BELOW), and **Newville gravelly loam, 3 to 10 percent slopes** (CITED ABOVE, under **Corning-Newville gravelly loams**)

NEWVILLE SERIES

General Information

The Newville series are nearly level to very steep, well-drained soils formed from conglomerate and siltstone of the Tehama formation. The soils have a surface soil that is brown to yellowish brown, slightly acid, and gravelly. The subsoil is strong brown to reddish brown gravelly clay that is slightly acid to neutral. These soils are on rounded foothills in the northwestern part of the

county at elevations of 300 to 2,000 feet. The vegetation is mostly annual grasses and forbs but includes some blue oaks. Some areas of these soils are cultivated, but most areas are used for pasture and range.

The surface soil is yellowish brown, pale brown, or brown in color. Its texture is generally gravelly loam but in places it is nearly a gravelly sandy loam or gravelly clay loam. The color of the subsoil is yellowish red, strong brown, or yellowish brown, and the texture is gravelly or slightly gravelly clay loam. The substratum is more yellow than the subsoil. Both the surface soil and the subsoil range from slightly acid to neutral.

Newville gravelly loam, 3 to 10 percent slopes (NrB)-This soil is less steep but is otherwise similar to the **Newville gravelly loam, 10 to 30 percent slopes** cited directly below. Runoff is slow to medium and the erosion hazard is slight to moderate.

Newville gravelly loam, 10 to 30 percent slopes (NrD)-This soil is on rounded foothills in the western par of the county. These areas vary considerably in size and shape; some areas are more than 500 ares in size. The surface is generally smooth, but many areas have been cut by short drainageways and are undulating. This soil is well drained. Permeability is slow, the available water holding capacity is low, and fertility is moderate to low. Runoff is medium, and the erosion hazard is moderate. In an area 3 to 4 miles north of Flournoy and in another area 9 miles north of Red Bluff, the substratum is partly cemented and is very slowly permeable to roots and water. The clay subsoil, which is at a depth of 10 to 20 inches, is slowly penetrated by roots and water. Included with this soil in mapping are areas of Corning, Altamont, and Dibble soils and some areas that have slopes of less than 10 percent.

Newville gravelly loam, 10 to 30 percent slopes, eroded (NrD2)-This soil is in drainageways in rounded foothills in the western part of the county. The drainageways are cut by gullies that are 1 foot or more in depth. Most areas of this Newville soil are used for pasture and range, but the value of the soil for pasture and range and for dry-farmed grain has been reduced by erosion. Included with this soil in mapping are small areas of Dibble, Altamont, and Corning soils.

Newville gravelly loam, 30 to 50 percent slopes (NrE)-This soil is steeper but is otherwise similar to the **Newville gravelly loam, 30 to 50 percent slopes** cited above. Runoff is rapid. The hazard of erosion is severe.

PERKINS SERIES

General Information

The Perkins series are nearly level, well-drained soils formed in gravelly alluvium derived from sandstone, shale, and schist. The surface soil is brown, slightly acid gravelly loam, and the subsoil is reddish brown, slightly acid to medium acid gravelly clay loam.

Perkins gravelly loam, 0 to 3 percent slopes (PkA)-This soil is on low terraces west of the Sacramento River. Most areas are less than 500 acres in size and are in long, narrow stringers, the surface of which is smooth. The soil is 10 to 50 percent gravel. This soil is well drained. Permeability is moderately slow, and the available water holding capacity and fertility are moderate. Runoff is slow, and there is no erosion hazard. Included with this soil in mapping are small areas of Arbuckle, Kimball, and Moda soils.

Perkins gravelly loam, 3 to 8 percent slopes (PkB)-This soil is on the edges of terraces. Runoff is slow to medium, and the erosion hazard is slight to moderate.

RED BLUFF SERIES

General Information

The Red Bluff series are nearly level, well-drained soils that formed in old alluvium derived from sandstone shale, and schist of the Coast Range Mountains. The surface soil is reddish-brown, strongly granular gravelly loam, and the subsoil is red, massive, and brittle clay loam. In places in cultivated areas, the soils are strongly acid throughout. Red Bluff soils are on high terraces west of the Sacramento River at elevations of 300 to 1,500 feet. The vegetation is annual grasses and forbs. Most areas are used for pasture and range.

Red Bluff gravelly loam, 0 to 3 percent slopes (Rg)-This soil is on the smooth tops of high terraces west of the Sacramento River. The areas are oval in shape, and some of them are more than 100 acres in size. The soil is 15 to 50 percent gravel. This soil is well drained and permeability is moderately slow. Fertility is low and available water holding capacity is moderate. Runoff is slow, and there is no erosion hazard. Most areas of Red Bluff soil are used for pasture and range. The quality of the forage is poorer in areas that are cleared and clutivated than in areas that still have a moderately dense stand of blue oaks.

Red Bluff gravelly loam, hardpan substratum, 0 to 3 percent slopes (Rh)-This soil usually has a cemented layer at a depth of approximately 40 inches, which results in a perched water table for short periods during the winter months. Water does not penetrate the substratum but drains laterally from the soil. If irrigation water it must be carefully applied to avoid forming a perched water table.

Red Bluff loam, 0 to 3 percent slopes (Rb)-This soil is 5 to 15 percent gravel but is otherwise similar to Red Bluff gravelly loam, 0 to 3 percent slopes. The available water holding capactiy is high.

REDDING SERIES

General Information

The Redding series are nearly level to gently sloping soils that formed in old alluvium derived mainly from sedimentary and metamorphic rocks. The surface soil is yellowish red, strongly acid gravelly clay and overlies a yellowish red hardpan. In most areas these soils are shallow over the hardpan and have a hogwallow microrelief. All but a few areas of these soils are on high terraces west of the Sacramento River at elevations from 300 to 1,00 feet. The vegetation is mostly annual grasses and forbs but includes scattered blue oaks. Most areas are used for pasture and rangeland.

Redding gravelly loam, 0 to 3 percent slopes (RnA)-Most of this soil is on the tops of high terraces west of the Sacramento River. A small acreage is east of the within areas of Red Bluff, Los Molinos, and Vina soils. The size of the areas varies, but some areas are more than 500 acres in size. The surface is uneven because of the hogwallow microrelief. The soil is 15 to 50 percent gravel. This soil is well drained. Permeability is very slow, and fertility an available water holding capacity are low. The cemented subsoil is nearly impervious to roots and water, and most of the water therefore drains laterally from the soil. Runoff hazard is slow, and the erosion hazard is slight. Included with this soil in mapping are areas of Corning and Red Bluff Soils.

Redding gravelly loam, 3 to 8 percent slopes (RnB)-This soil is along the edges of terraces or in small drainageways that cut through the terraces. The erosion hazard is moderate.

RIVERWASH

Riverwash (Rr)-consists of channels of intermittent streams and of active streams where the water is high. The areas are made up of deposits of sand and gravel, some of which are mined. Included with Riverwash in mapping are small areas of Cortina, Columbia, Maywood, Molinos, Orland, and Vina soils. Areas of Riverwash have no agricultural value.

TEHAMA SERIES

General Information

The Tehama series are nearly level, well drained soils formed in mixed alluvium, chiefly from sedimentary rock. The surface soil is pale brown, slightly acid loam or silt loam, and the subsoil is brown or yellowish brown, neutral clay loam. These soils are on low terraces, mostly west of the Sacramento River, at elevations of 200 to 1,000 feet. Most areas have been cultivated.

Tehama loam, 0 to 3 percent slopes (TaA)-This soil has a surface soil of loam but is otherwise similar to the Tehama silt loam, 0 to 3 percent slopes, cited directly below. Water infiltrates this soil slightly faster than it does the loam.

Tehama silt loam, 0 to 3 percent slopes (Tc)-Most of this soil is on low terraces west of the Sacramento River, but a small acreage is east of the river in areas near Bend and Red Bluff. The areas vary considerably in size and shape, and some are more than 500 acres in size. The surface is smooth. This soil is well drained. Permeability is slow. The available water holding capacity and fertility are moderate. Runoff is slow, and there is no erosion hazard. Included with this soil in mapping are areas of Arbuckle, Maywood, and Hillgate soils.

Tehama loam, 3 to 8 percent slopes (TaB)-Most areas of this soil are along the edges of terraces. It is more difficult to prepare this soil for irrigation than the nearly level Tehama soils.

Tehama gravelly loam, 0 to 3 percent slopes (Tb)-This soil is comprised of 10 to 20 percent of rounded gravel. The gravel interferes with cultivation and the preparation of a seedbed.

ZAMORA SERIES

General Information

The Zamora series are nearly level, well drained soil formed from fairly recent alluvium derived from sedimentary, metamorphic, and igneous rocks. These soils are on the flood plains along the Sacramento River above the flood stage of the river. Their surface soil is grayish brown and is medium textured to moderately fine textured. THe subsoil is dark grayish brown and is moderately fine textured. Zamora soils are deep and typically neutral throughout. Most areas are cultivated.

Zamora loam, 0 to 3 percent slopes (Za)-This soil has a surface soil of loam but is otherwise similar to the Zamora silt loam, 0 to 3 percent slopes cited directly below. Irrigation Water penetrates this soil faster than it does the silt loam.

Zamora silt loam, 0 to 3 percent slopes (Zm)-This soil is west of the Sacramento River along major streams. The areas are parallel to streams, are fairly small, and have a smooth surface. The soil is well drained. Runoff is very slow, and permeability is moderately slow. The available water holding capacity and fertility are high. There is no erosion hazard. Included with this soil in mapping are areas of Columbia and Orland soils.

*text taken directly from USDA, Soil Conservation Service's Soil Survey, Tehama County California, May 1967.

IMPORTANT FARMLAND MAP CLASSIFICATIONS
Adapted from the Advisory Guidelines for the Farmland Mapping and Monitoring Program

The following definitions were taken directly from the Advisory Guidelines for the Farmland Mapping and Monitoring Program, which was prepared by the California Department of Conservation in 1984. The information provided in this document is derived from two major sources; the California Government Code (Section 65570) and **USDA Soil Conservation Service Important Farmland Inventory System**. There are eight classification types designated on these maps, all eight are found in the Red Bluff Planning Area. The following descriptions, give detailed criteria for each classification type. Please see the glossary for definitions of specific terms.

Prime Farmland (Section 201)-...is land which has the best combination of physical and chemical characteristics for the production of crops. It has the soil quality, growing season and moisture supply needed to produce sustained high yields of crops when treated and managed, including water management, according to current farming methods. Prime Farmland must have been used for the production of irrigated crops within the last three years. It does not include publicly owned lands for which there is an adopted policy preventing agricultural use.

In addition, the soil must also meet **all** of the following criteria to be classified Prime Farmland;

a. Water-The soils have xeric, ustic, or aridic (torric), moisture regimes in which the available water capacity is at least 4.0 inches (10 cm) per 40 to 60 inches (1.01 to 1.52 meters) of soil, and a developed irrigation water supply that is dependable and of adequate quality. A dependable water supply is one which is available for the production of the commonly grown crops in 8 out of 10 years; and

b. Soil Temperature Range-The soils have a temperature regime that is frigid, mesic, thermic, or hyperthermic (pergelic and cryic regimes are excluded). These are soils that, at a depth of 20 inches (50.8 cm), have a mean annual temperature higher than 32^0F (0^0C). In addition, the mean summer temperature at this depth in soils with an O horizon is higher than 47^0F (8^0C); in soils that have no O horizon, the mean summer temperature is higher than 59^0F (15^0C); and

c. Acid-Alkali Balance-The soils have a pH between 4.5 and 8.4 in all horizons within a depth of 40 inches (1.01 meter); and

d. Water Table-The soils have no water table or have a water table that is maintained at a sufficient depth during the cropping season to allow cultivated crops common to the area to be grown; and

e. Soil Sodium Content-The soils can be managed so that, in all horizons within a depth of 40 inches (1.01 meter), during part of each year the conductivity of the saturation extract is less than 4 mmhos/cm and the exchangeable sodium percentage is less than 15; and

*f. **Flooding***-Flooding of the soil (uncontrolled runoff from natural precipitation) during the growing season occurs infrequently, taking places less often than once every two years; and

*g. **Erodibility***-The product of K (erodibility factor) x percent of slope is less than 2.0; and

*h. **Permeability***-The soils have a permeability rate of at least 0.06 inches (0.15 cm) per hour in the upper 20 inches (50.8 cm) and the mean annual soil temperature at a depth of 20 inches is less than 59^0F (15^0C); the permeability rate is not a limiting factor if the mean annual soil temperature is 59^0F (15^0C) or higher; and

*i. **Rock Fragment Content***-Less than 10 percent of the upper 6 inches (15.24 cm) in these soils consists of rock fragments or coarser than 3 inches (7.62 cm); and

*j. **Rooting Depth***-The soils have a minimum rooting depth of 40 inches (1 meter).

Farmland of Statewide Importance (Section 202)-..is land other than "Prime Farmland" which has a good combination of physical and chemical characteristics for the production of crops. It must have been used for the production of irrigated crops within the last three years. It does not include publicly owned lands for which there is an adopted policy preventing agricultural use.

In addition, the soil must also meet **all** of the following criteria in order to be classified Farmland of Statewide Importance;

*a. **Water***-The soils have xeric, ustic, or aridic torric, moisture regimes in which the available water capacity is at least 3.5 inches (8.89 cm) per 40 to 60 inches (1.01 to 1.52 meters) of soils. They have a developed irrigation supply that is dependable and of adequate quality. A dependable water supply is one which is available for the production of the commonly grown crops in 8 out of 10 years; and

*b. **Soil Temperature Range***-The soils have a temperature regime that is frigid, mesic, thermic or hyperthermic (pergelic and cryic regimes are excluded). These are soils that, at a depth of 20 inches (50.8 cm), have a mean annual temperature higher than 32^0F (0^0C). In addition, the mean summer temperature at this depth in soils with an O horizon is higher than 47^0F (8^0C); in soils that have no O horizon, the mean summer temperature is higher than 59^0F (15^0C); and

*c. **Acid-Alkali Balance***-The soils have a pH between 4.5 an 9.0 in allhorizons within a depth of 40 inches (1.01 meter) or in the root zone if the root zone is less than 40 inches deep; and

d. Water Table-The soils have no water table or have a water table that is maintained at a sufficient depth during the cropping season to allow cultivation crops common to the areas to be grown; and

e. Soil Sodium Content-The soils can be managed so that, in all horizons within a depth of 40 inches (1.01 meter), or in the root zone if the root zone is less than 40 inches deep; during part of each year the conductivity of the saturation extract is less than 16 mmhos/cm and the exchangeable sodium percentage is less than 25: and

f. Flooding-Flooding of the soil (uncontrolled runoff from natural precipitation) during the growing season occurs infrequently, taking place less often than once every two years; and

g. Erodibility-The product of K (erodibility factor) x percent f slope is less than 3.0; and

h. Rock Fragment Content-Less than 10 percent of the upper 6 inches (15.24 cm) in these soils consists of rock fragments coarser than 3 inches (7.62 cm).

Unique Farmland (Section 203)-...is land which does not meet the criteria for "Prime Farmland" or "Farmland of Statewide Importance", that is currently used for the production of specific high economic value crops. It has the special combination of soil quality, location, growing season and moisture supply needed to produce sustained high quality or high yields of a specific crop when treated and managed according to current farming methods. Examples of such crops may include oranges, olives, avocados, rice, grapes, and cut flowers. It does not include publicly owned lands for which there is an adopted policy preventing agricultural use.

Characteristically Unique Farmland:

a. Is used for specific high value crops; and

b. Has a moisture supply that is adequate for the specific crop; the supply is from stored moisture, precipitation, or a developed irrigation system; and

c. Combines favorable factors of soil quality, growing season, temperature, humidity, air drainage, elevation, exposure, or other conditions, such as nearness to market, that favor growth of a specific food or fiber crop; and

d. Excludes abandoned orchards or vineyards and extremely low yielding crops, as determined in consultation with the County Cooperative Extension Director and Agricultural Commissioner.

High value crops are listed in California Agriculture, the annual report of the California Department of Food and Agriculture. The Department of Conservation maintains a list of current crops which qualify land as Unique Farmland. In order for land to be classified Unique Farmland, the crop grown on the land must have been qualified for the list in the last three years.

Farmland of Local Importance (Section 204)-...is either currently producing crops, or has the capability of production. "Farmland of Local Importance" is land other than "Prime Farmland," "Farmland of Statewide Importance," or "Unique Farmland." This land may be important to the local economy due to its productivity. It does not include publicly owned lands for which there is an adopted policy preventing agricultural use.

"Farmland of Local Importance" was initially identified by a local advisory committee convened in each county by the Soil Conservation Service. Authority to recommend changes to the category of "Farmland of Local Importance" shall rest with the board of supervisors in each county. The Department shall present each draft map to the board of supervisors for their review. After the presentation of a draft map by the Department, the board of supervisors shall have a 60-day review period in which to request any needed modifications. An extension may be granted upon request. The county supervisors may then approve or not approve the "Farmland of Local Importance" category of the map.

Grazing Land (Section 205)-...is defined in Section 65570(b)(2) of the Government Code as:

> "...land on which the existing vegetation, whether grown naturally or through management, is suitable for grazing or browsing of livestock."

The minimum mapping unit for "Grazing Land" is 40 acres.

"Grazing Land" does not include land previously designated as "Prime Farmland," "Farmland of Statewide Importance," "Unique Farmland" or "Farmland of Local Importance," and heavily brushed, timbered, excessively steep, or rocky lands which restrict the access and movement of livestock.

Urban and Built-Up Land (Section 206)-...is used for residential, industrial, commercial, construction, institutional, public administrative purposes, railroad yards, cemeteries, airports, golf courses, sanitary landfills, sewage treatment plants, water control structures, and other development purposes. Highways, railroads, and other transportation facilities are mapped as a part of Urban and Built-Up Land if they are a part of the surrounding urban areas.

The minimum mapping unit is ten acres. Units of land smaller than ten acres will be incorporated into the surrounding map classifications. The building density for residential use must be at least one structure per 1.5 acres (or approximately 6 structures per 10 acres). "Urban and Built-Up Land" must contain human-made structures or the infrastructure required for development (eg., paved roads, sewers, water, electricity, or in specific circumstances, drainage or flood control facilities) that are specifically designed to serve that land. Parking lots, storage and distribution facilities, and industrial uses such as large packing operations for agricultural produce will generally be mapped as "Urban and Built-Up Land," even though they are associated with agriculture.

"Urban and Built-Up Land" does not include strip mines, borrow pits, gravel pits, farmsteads, ranch headquarters, commercial feedlots, greenhouses, poultry facilities, and road systems for freeway interchanges outside of areas classified as "Urban and Built-Up Land" areas.

Within areas classified as "Urban and Built-Up Land" areas, vacant and nonagricultural land which is surrounded on all sides by urban development and is s 40 acres or less in size will be mapped as "Urban and Built-Up Land." Vacant and nonagricultural land larger than 40 acres in size will be mapped as "Other Land."

Other Land (Section 207)-...is that land which is not included in any of the other mapping categories. The following types of land are generally included:

a. rural development which has a building density of less than one structure per 1.5 acres, but with at least on structure per ten acres;

b. marginal agricultural lands;

c. brush, timber and other lands not suitable for livestock grazing;

d. government lands not available for agricultural use;

e. road systems for freeway interchanges outside of "Urban and Built-Up Land" areas;

f. vacant and nonagricultural land larger than 40 acres in size and surrounded on all sides by urban development;

g. a variety of other rural land uses.

Land Committed to Nonagricultural Use (Section 208)-...is land that is permanently committed by local elected officials to nonagricultural development by virtue of decisions which cannot be reversed simply by a majority vote of a city council or county board of supervisors.

County boards of supervisors and city councils will have the final authority to designate lands in this category pursuant to the requirements of this section. The Department will work with city and county planning staffs to obtain this information.

"Land Committed to Nonagricultural Use" will be shown on an overlay to the Important Farmland Series map. The current land use will be indicated on the base map, with the overlay indicating the areas that are "Committed to Nonagricultural Use."

"Land Committed to Nonagricultural Use" must be designated in an adopted, local general plan for future nonagricultural development. The resulting development must meet the requirements of "Urban and Built-Up Land" (Section 206) or "Other Land" (Section 207).

"Land Committed to Nonagricultural Use" must also meet the requirements of either (a) or (b) below;

a. It must have received one of the following final discretionary approvals:

1. Tentative subdivision map (approved per the Subdivision Map Act);

2. Tentative or final parcel map (approved per the Subdivision Map Act);

3. Recorded development agreement (per Section 65864 of the Government Code);

4. Other decisions by a local government which are analogous to items #1-3 above and which exhibit the element of permanence discussed in Section 208. Zoning by itself does not qualify as a permanent commitment.

OR

b. It must be the subject of one of the final fiscal commitments to finance the capital improvements specifically required for future development of the land in question as shown below:

1. Recorded Resolution of Intent to form a district and levy an assessment;

2. Payment of assessment;

3. Sale of bonds;

4. Binding contract, secured by bonds, guaranteeing installation of infrastructure.

5. Other fiscal commitments which are analogous to items #1-4 above and exhibit the element of permanence discussed in Section 208.

APPENDIX M

Soil Candidates for Important Farmland Classification

Prime Farmland Candidates

Symbol	Soil Name
Au	Arbuckle gravelly fine sandy loam, 0 to 3 percent slopes
AvA	Arbuckle gravelly loam, 0 to 3 percent slopes
Aw	Arbuckle gravelly loam, clayey substratum, 0 to 3 percent slopes
Cc	Clear Lake clay
CmA	Columbia fine sandy loam, 0 to 3 percent slopes
CmB	Columbia fine sandy loam, 3 to 8 percent slopes
CsA	Columbia silt loam, 0 to 3 percent slopes
Mc	Maywood fine sandy loam, 0 to 3 percent slopes
Md	Maywood fine sandy loam, moderately deep, 0 to 3 percent slopes
Mf	Maywood loam, high terrace, 0 to 3 percent slopes
Mh	Maywood silt loam, 0 to 3 percent slopes
PkA	Perkins gravelly loam, 0 to 3 percent slopes
PkB	Perkins gravelly loam, 3 to 8 percent slopes
Rb	Red Bluff loam, 0 to 3 percent slopes
Rg	Red Bluff gravelly loam, 0 to 3 percent slopes
Rh	Red Bluff gravelly loam, hardpan substratum, 0 to 3 percent slopes
TaA	Tehama loam, 0 to 3 percent slopes
Tb	Tehama gravelly loam, 0 to 3 percent slopes

Za	Zamora loam, 0 to 3 percent slopes

Farmland of Statewide Importance

Symbol	Soil Name
HgA	Hillgate loam, 0 to 3 percent slopes
Hl	Hillgate silt loam, 3 to 8 percent slopes
NrB	Newville gravelly loam, 3 to 10 percent slopes
TaB	Tehama loam, 3 to 8 percent slopes

source: Soil Candidate Listings for Prime Farmland and Farmland of Statewide Importance, Tehama County California Department of Conservation, Farmland Mapping and Monitoring Program, Feb. 2, 1992.

APPENDIX N

Soils Classified as Erosion Hazards

Symbol	Soil Name
CmB	Columbia fine sandy loam, 3 to 8 percent slopes
CsB	Columbia silt loam, 3 to 8 percent slopes
CxB2	Corning-Newville gravelly loams, 3 to 10 percent slopes, eroded
NhB	Nacimiento-Newville complex, 3 to 10 percent slopes
NrD	Newville gravelly loam, 10 to 30 percent slopes
NrB	Newville gravelly loam, 3 to 10 percent slopes
NrD2	Newville gravelly loam, 10 to 30 percent slopes, eroded
NrE	Newville gravelly loam, 30 to 50 percent slopes
PkB	Perkins gravelly loam, 3 to 8 percent slopes
TaB	Tehama loam, 3 to 8 percent slopes

source: Soil Survey, Tehama County USDA Soil Conservation Service, 1967.

APPENDIX O

Air Quality Data (Ozone and PM10)

Ozone
(Parts per hundred million)

MONTH	MEAN OF DAILY MAXIMUM (hourly)	HIGHEST VALUE	HIGHEST VALUE DAY (of the month)
JULY	7.3	10	28*
AUGUST	7.1	10	24
SEPTEMBER	7.4	11	19

Particulate Matter (< 10 microns in diameter)
(micrograms per cubic meter)

MONTH	MONTHLY MEAN	HIGHEST VALUE	HIGHEST VALUE DAY (of the month)
JULY	33.8	43	29
AUGUST	38.6	55	16
SEPTEMBER	43.4	51	27

* The first of two of more days

NOTE: California Ambient Air Quality Standards:
Ozone = > 9 parts per hundred million
PM10 = > 50 micrograms per cubic meter

sources: Summary of 1990 Air Quality Data and Air Quality Data Quarterly Report, July, August and September 1991, California Air Resources Board.

APPENDIX P

Emmisions by Facility

FACILITY NAME	TOG	ROG	CO	NOX	SOX	PM
Diamond International Corp.	72	9	1	14	0	37
Packaging Co. of California	2	10	2	16	0	1
Louisiana Pacific Corp.	0	0	0	0	0	18
Fiber Enterprises	3	2	0	0	0	0
Al Bon Company	0	0	0	1	3	7
Crown Plastics	23	17	0	0	0	12

units=tons/year

TOG=Total Organic Gases

ROG=Reactive Organic Gases (includes Ozone)

CO=Carbon Monoxide

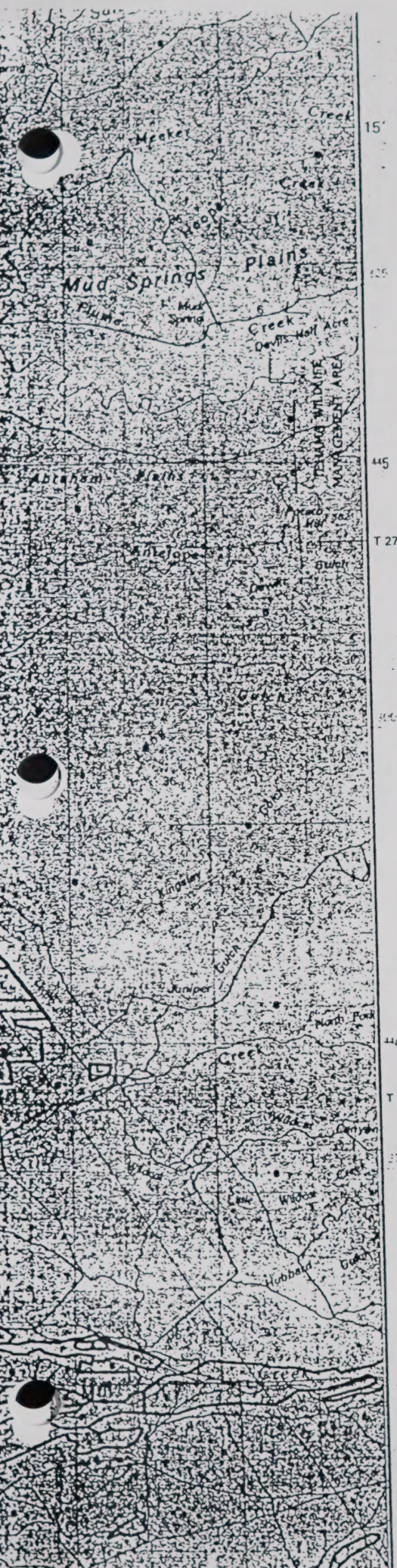
NOX=Nitrogen Oxides

SOX=Sulfur Oxides

PM=Particulate Matter

source: Emissions by Facility Summary, 1989 Draft Emissions Inventory
California Air Resources Board

APPENDIX Q



The following definitions are summarized from the "Advisory Guidelines for the Farmland Mapping and Monitoring Program"

P — **PRIME FARMLAND**
Land with the best combination of physical and chemical features for the production of agricultural crops

S — **FARMLAND OF STATEWIDE IMPORTANCE**
Land with a good combination of physical and chemical features for the production of agricultural crops

U — **UNIQUE FARMLAND**
Land of lesser quality soils used for the production of the State's leading agricultural cash crops

L — **FARMLAND OF LOCAL IMPORTANCE**
Land in, or with the potential for agricultural production which does not meet the criteria of any of the above categories

G — **GRAZING LAND**
Land on which the existing vegetation is suited to the grazing of livestock

D — **URBAN AND BUILT-UP LAND**
Land occupied by structures or infrastructure to accommodate a building density of at least one unit to one and one-half acres, or approximately six structures to ten acres.

X — **OTHER LAND**
Land which does not meet the criteria of any other category


Red Bluff
Red Bluff Municipal Airport
Red Bluff Pumping Station
Gaging Station
Fork
Creek
Brickyard
T 26 N

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